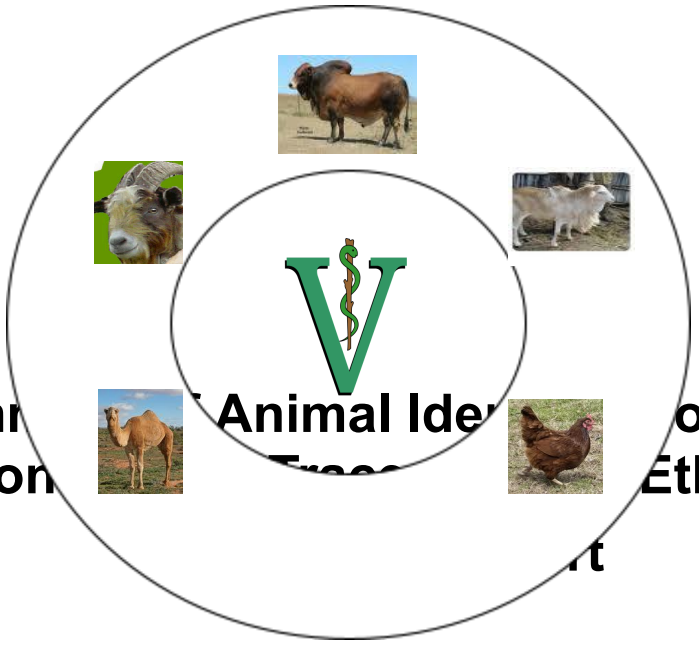
EUROPEAN UNION

Technical Assistance to Support implementation of the Project

“Improving and Integrating Animal Health Services in the Livestock Value Chain through Public Private Dialogue in Ethiopia”



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Dr. Sloboden Chokrevski

Animal Identification, Movement Control and Traceability

Short Term Expert

KEY DATA

Name of Project:	Technical Assistance to support the implementation of the Project "Improving and Integrating Animal Health Services in the Livestock Value Chain through Public : Private Dialogue" EU Publication Ref.: EuropeAid/130753/D/SER/ET CRIS No.: FED/2009/021 - 388 Identification No: ET/001/09
Contractor:	**Agriconsulting Europa SA** in consortium with: ▪ OPERA soc. coop. a.r.l. ▪ Istituto Zooprofilattico Sperimentale della Lombardia e dell'Emilia Romagna (IZSLER); African Breeders & Total Cattle Management, Ltd.
Contracting Authority:	National Authorising Officer, of the European Development Fund in Ethiopia, Ministry of Finance & Economic Development
Start/End Date:	6th June 2012 / 5th June 2014
Budget:	**€ 1,335,910.00**
Beneficiaries:	Government of the Federal Democratic Republic of Ethiopia, Ministry of Agriculture, Animal & Plant Health Regulatory Directorate, Ethiopian Veterinary Association, Live Animal and Meat Exporters, Animal health service providers and livestock keepers.
Primary Location:	Addis Ababa
Secondary Locations:	3 selected regions – Oromiya Region (Borana area), Amhara Region (Gondar), Tigray Region (Shire)

DISTRIBUTION LIST

Recipient	Copies	Format
Dr. Bewket Siraw, Director APHRD, Ministry of Agriculture	3	English

QUALITY ASSURANCE STATEMENT

Version		Status	Date
Field Mission Report		1st Draft Version	13/12/2013
	Name	**Position**	**Date**
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Abbreviations and Acronyms

AESA	Agriconsulting Europe SA
AHA	Animal Health Assistant
AHD	Animal Health Directorate
AI	Animal Identification
BSE	Bovine Spongiform Encephalopathy
CA	Competent Authority
CAC	Codex Alimentarius Commission
CBPP	Contagious Bovine Pleuro-Pneumonia
CCPP	Contagious Caprine Pleuro-Pneumonia
CDB	Central Data Base
CAHW	Community-based Animal Health Worker
DVM	Doctor of Veterinary Medicine
EA	Export Abattoir
EC	European Commission
EFL	Export Feedlot
EQ	Export Quarantine
EU	European Union
EVA	Ethiopian Veterinary Association
FAO	Food and Agriculture Organization
FMD	Foot and Mouth Disease
HACCP	Hazard Analysis on Critical Control Points
ICAR	International Committee for Animal Recording
ISO	International Standard Organisation
IPPC	International Plant Protection Committee
IVCLSD	International Veterinary Certificate Lumpy Skin Disease
LVC-PPD	Improving and integrating animal health services in the Livestock Value Chain through Public Private Dialogue in Ethiopia
MC	Movement Control (System)
MOA	Ministry of Agriculture
NTB	Non Tariff Barriers
OIE	World Animal Health Organization
PDA	Handheld Computer
PLM	Primary Livestock Markets
RHK	Register of Holdings and Keepers
RFID	Radio Frequency Identification Devices
RVF	Rift Valley Fever
SLM	Secondary Livestock Markets
SPS	Sanitary and Phyto-Sanitary standards
STE	Short Term Expert
T	Traceability (System)
TAHC	Terrestrial Animal Health Code
TADs	Trans-boundary Animal Diseases
USAID	United States Agency for International Development
WHO	World Health Organization
WTO	World Trade Organization

1 Executive Summary

Under the PE2 work plan of the project, the Agriconsulting consortium recruited Dr. Sloboden Chokrevski as a short-term expert (STE) in Animal Identification (AI), Movement Control (MC) and Traceability (T) for the activities 1.6.1, 1.6.2, 1.6.3 and 1.6.4 related to "Technical assistance for animal identification, movement control and traceability". The, AI, MC and T STE from 26th of September to 23th of November 2013, performed the mission in Ethiopia, at the Animal Health Directorate of Ministry of Agriculture.

As foreseen in the project ToR, from 7th to 20th of October, he carried out a 15 day field mission accompanied by his counterpart Dr Getachew Jamber from AI Case Team of the AHD and later joined by the Certification STE Dr Jazeps Remeicans and his counterpart Dr. Melaku Assefa from Export Abattoir Case Team of AHD. The main purpose of the field mission of the AI, MC and T STE was to assess the specific characteristics of the pastoral and agro-pastoral production systems of the eastern and southern lowlands, "kola", as well as the intermediate, "woina dega", zones of Ethiopia, the main regions from which animals are sourced for export. The mission included visits to export feedlots in Adama wereda, Oromia region, Export quarantine in Mille – Afar Region, export abattoirs in Modjo and Debre Zeit (Oromia region) and final livestock markets in Borana Zone. The expert carried out extensive meetings and interviews with different levels of veterinary service personnel responsible for movement control, slaughtering and certification of export of animals and meat, regional and local officials and various institutions and stakeholders in the process of export of live animals and meat from Ethiopia (see Annex 2). During the interactive interviews and discussions with different level veterinary officers and different stakeholders various ideas and possibilities for establishment of animal identification and traceability system for export were proposed and discussed, particularly taking into consideration specifics of Ethiopian livestock production systems.

On 20th of November, during extensive 4 hours interactive session in front of the leadership of Animal Health Directorate, officials from Ministry of Agriculture, University and International Organisations, the STE presented the concept of the Pilot Project for Animal Identification and Traceability of Export of Cattle and Beef, Establishment of animal movement documents, as well as medium and long term strategy guidelines for establishment Animal Identification, Movement Control and Traceability (AI, MC and T) in Ethiopia. The same presentation was carried out 3 days later for the representatives of USAID.

The total export of live animals and meat from Ethiopia in 2012 reached approximately 300 million US $ and Government of Ethiopia have ambition and plan to rise it up to 1 billion in the future. Therefore, when analysing the cost benefit and incentives of establishment of AI and T system, one should have in mind not how many new markets will be conquered, but more importantly, how to secure existing ones, bearing in mind that almost all importing countries are starting to demand certain level of AI and T from the exporting countries. If we take in consideration only the aforementioned export figures, even without calculating all other benefits of AI and T system, it is more than clear that Ethiopia should start with the AI and T system building as soon as possible.

The AI, MC and T STE within two months of the project engagement tried to give answers to where and how to start with AI, MC and T, primarily led by the analysis of the current state in the Ethiopian livestock sector, operations and capacities of the veterinary services and priorities of the Government of Ethiopia, particularly considering the priorities set by the leadership of the AHD of the Federal Ministry of Agriculture.

Non existence of animal movement documents is making traceability of animals and their products almost impossible and their introduction should be paramount for the veterinary

service. The proposed strategy is foreseeing immediate design and enforcement of compulsory animal movement documents and when established, merging with the Pilot AI & T in the medium term phase, in order to establish tracing back of animals down to the primary livestock markets, pastures and farms;

The importance of export of live animals and meat for the country and number of livelihoods directly or indirectly depending on it, leads the clear priority in that direction. Therefore, instead of starting from identification of individual animals on farms and pastures and registering individual holdings, which is currently unrealistic due to the numbers of animals and availability of resources, the design of the AI and T system will start not from the “head” but from the “tail” – the export of cattle and beef. The idea behind this concept is to establish traceability backwards to the certain point where this can be presented as a case to the importing countries. The pilot project will establish traceability from export of cattle from export quarantine (EQ) and beef from export abattoirs (EA), backwards through export feedlots (EFL) down to the secondary livestock markets (SLM) where animals are going to be tagged and entered in to the system. During this period of 3 to 4 months, the veterinary service of Ethiopia can prove traceability of individual animal and certify animal health status of exporting live cattle and animals intended for beef export.

The proposed system will not be “bullet proof” and AI and T are only tools that serve other veterinary activities. They cannot *per se* protect the animals from biohazards. Many things, starting from biosecurity alongside the chain of movements of the animals that entered the system, must be gradually and considerably improved in parallel with building of the system of AI and T.

2 INTRODUCTION

2.1 What Is Animal Identification and Traceability?

Animal identification (AI) refers to keeping records on individual farm animals or groups (e.g., flocks or herds) of farm animals, so that they can be tracked more easily from their birth through the marketing chain.

Traceability (T) is broadly defined by ISO8402 standard as the "*aptitude to find the history, the use or the localization of an entity by means of recorded identifications*". From the perspective of animal production, traceability refers to the ability to access the history of an animal or a group of animals, through all stages of their life. The scope may extend to include tracing the history of an animal product along the product value chain. Traceability has become a vital component of livestock development programmes in many countries, where it is used to control the safety and quality of foods of animal origin.

By OIE Terrestrial Animal Health Code Definition:

Animal identification means the combination of the identification and *registration* of an *animal* individually, with a unique identifier, or collectively by its *epidemiological unit* or group, with a unique group identifier.

Animal identification system means the inclusion and linking of components, such as identification of *establishments*/owners, the person(s) responsible for the *animal(s)*, movements and other records, with *animal identification*.

Animal traceability means the ability to follow an *animal* or a group of *animals* during all stages of their life.

2.2 History

Animal Identification and Traceability (AI and T) has been used since earliest times, since animals were first used for human food and production. In the beginning, animal identification was not used for health purposes and the main objective was to establish animal ownership at a very local level in order to resolve disputes between herdsmen and neighbouring villages. Such systems were simple and based on marks applied to the hide or skin of the animal, using dyes or paint, brands, or sometimes even incisions or excisions. An essential element of even the simplest system of animal identification is that the marks used are associated with a particular individual, thus establishing ownership of and/or responsibility for the animal involved. All these reasons for livestock identification still exist today and there are ongoing conflicts, particularly in Africa, with many consecutive human casualties. Those conflicts originate primarily in disputes over the ownership of cattle and access to pastures.

The importance of individual animal identification significantly increased at the time when the first attempts to improve animal productivity through breeding selection were made, assuring recording and maintenance of the results. Over time, as livestock production became more intense and trade of live animals began to increase, the AI systems started to become a featured part of the developing trade.

Animal health authorities have, for decades, marked animals in order to distinguish animals vaccinated against contagious diseases from those not vaccinated. However, the most important factor in recent history that turned people's attention to cattle identification and traceability was the bovine spongiform encephalopathy (BSE) crisis that occurred in the United Kingdom and Europe. Two of the tools used to help control the disease were

identification and traceability. These, together with scientific research, made it possible to implement the appropriate animal health strategies to fight BSE. As a result, the concept of identification and traceability, which was associated with the BSE crisis and was headline news in the world's media for a long time, also grew gradually in scale and became increasingly common in the terminology in use.

2.3 Animal Identification today

The use of animal identification and traceability has evolved as a result of growing animal production, which demands more information in order to increase production, improve genetics and control certain diseases. Current understanding of disease prevention and control, the implications of animal diseases and other pathogens for human health and food safety mean that animal identification and product traceability systems are more important today than ever before. In many countries, the traceability of domestic animals and of products of animal origin is a legal requirement and it is also a key element supporting credible international health certification. The implementation of the identification and traceability concept requires a set of elements, including devices for identifying animals. Different types and models of animal identification devices are in use in different countries, including various sorts of eartags, microchip implants and intraruminal boluses. The latest information technologies and the modern systems for animal identification and traceability are particularly important for the developing countries. Animal identification helps the producers and the institutions that support them, manage animals more effectively, implement herd/flock health programmes and apply more efficient breeding and genetic improvements.

2.4 International AI and T related standard-setting organisations

Animal identification and traceability are the subject of various international agreements and standards, such as the World Trade Organization Agreement on the Application of Sanitary and Phytosanitary Measures and its Agreement on Technical Barriers to Trade (WTO SPS Agreement), the World Organisation for Animal Health (OIE) Terrestrial animal health code (TAHC) and the Codex Alimentarius Commission (CAC) under the Joint FAO/WHO Food Standards Programme. Other organizations such as the International Committee for Animal Recording (ICAR) and the International Organization for Standardization (ISO) also play a role.

2.5 World Organization for Animal Health (OIE)

The World Organisation for Animal Health (OIE) is a leading international standard-setting organization for animal health and animal production and food safety encourages the use of AI & T systems in order to improve the effectiveness of their policies and activities relating to disease prevention and control, food safety and certification of exports. In 2006, the OIE's Terrestrial Animal Health Standards Commission established the first series of guidelines for identification and traceability on behalf of OIE Members. These guidelines were adopted in May of 2007 as official OIE standards in the Terrestrial Animal Health Code. Chapter four includes two sections on AI & T: section 4.1 which defines general principles, and section 4.2 which provides general guidance on the design and implementation of systems. Under internationally recognized OIE standards, effective AI and T systems allow compartmentalization and regionalization of disease outbreaks, so that trade could continue for animal products from other parts of the country. The OIE's Terrestrial Code includes two sections that deal with compartmentalization: section 4.3 which defines general principles of zoning and compartmentalization, and section 4.4 which discusses application of compartmentalization. Bearing in mind the need to coordinate the development and adoption of global standards for identification and traceability of animals and products, the OIE collaborates closely on this topic with the Codex Alimentarius Commission (CAC), which, like

the OIE, is a reference standard-setting organisation recognised by the World Trade Organization (WTO) in the SPS Agreement. The 2010 Terrestrial Animal Health Code recognizes AI and T as *"Tools for addressing animal health (including zoonoses), food safety issues and the strong relationship between animal identification and the traceability of animals and products of animal origin* ". The OIE indicates that animal identification, animal movement and changes in identification numbers of livestock or livestock establishments should be reported to a central national authority. A significant component of livestock and meat trade is depending on certification of animal health status to reduce the likelihood of disease transmission through meat or animal trade. Animal identification and movement traceability enables the certification of animal health.

2.6 Codex Alimentarius Commission CAC

The Codex Alimentarius Commission (CAC) was created in 1963 by two United Nations' organizations - the Food and Agricultural Organization (FAO) and the World Health Organization (WHO) – so as to develop food standards, guidelines and related texts, such as codes of practice, under the Joint FAO/WHO Food Standards Program. The main purpose of this program is to protect the health of the consumers, to ensure fair trade practices in the food trade and to promote coordination of all the food standards. The CAC takes primary responsibility for food safety, while the OIE is primarily responsible for animal health, including zoonoses and live animal identification. The OIE and the CAC collaborate closely in the development of standards relevant to the food production chain, including those for identification and traceability, and the bridge between live animals and products. The CAC has developed a standard entitled 'Principles for traceability/product tracing as a tool in the food inspection and certification system (CAC/GL 60-2006).

The Code of Hygiene Practice for Meat (Code) indicates that the principles of meat hygiene need to involve animal identification practices which "allow one to trace the animal back to its place of origin as much as is possible, in order to allow regulatory investigation where/when necessary". The Code stresses the importance of animal or group identification which is capable of tracing these from the abattoirs and the processing plants to their place of origin. The focus of the Code is to develop meat hygiene provisions which cover the entire process - from animal production systems to retail. The FAO (2004) published the Good Practices for the Meat Industry as their guide to the meat industry for implementing increasing quality and safety standards which would be required for trade. The document describes animal identification and traceability system mechanisms as a new standard that is becoming common in animal health management and consumer assurances.

2.7 World Trade Organization (WTO)

The World Trade Organization (WTO), founded in 1995, is the only global international organization dealing with the rules of trade between nations. It is an organization for trade facilitation through setting a system of trade rules. It is a forum for governments to negotiate trade agreements and a place for them to settle trade disputes. The World Trade Organization Agreement on the Application of Sanitary and Phytosanitary Measures and its Agreement on Technical Barriers to Trade (WTO SPS Agreement), recognises the World Organization for Animal Health (OIE), the Codex Alimentarius Commission (CAC) and International Plant Protection Committee (IPPC), as international standard-setting organizations for international trade.

2.8 ICAR & ISO

The International Committee for Animal Recording (ICAR) is the worldwide organization for the standardization of animal identification, recording and genetic evaluation. ICAR works through establishing and finding methods of animal identification, performance recording and genetic evaluation. Breeders' organizations worldwide are supported to provide better services to their farmers. The species of interest are cattle (both dairy and beef), sheep, goats, buffalo and, most recently, alpaca. ICAR produces guidelines and standards which are constantly updated and which should be applied according to local conditions, since no single method is suitable for all situations. Every recording organization can select its particular recording methodology, depending on their local conditions. In fact, ICAR provides the minimum requirements to ensure a satisfactory degree of uniformity, at the same time allowing maximum flexibility in the choice of methods. An agreement was signed with ISO in 2006 by which ICAR became the Registration Authority for ISO on ISO 11784 and 11785 conforming "radio frequency identification devices" (RFID). For this reason, ICAR developed independent procedures which can verify the compliance of RFID systems with the existing standards. Within the agreement with ISO, ICAR has tested hundreds of identification devices, it has approved most of them and it has, therefore, certified their quality for the animal industry worldwide. The list of approved identification devices is freely available from ICAR website (www.icar.org). The ISO standards 11784 and 11785 ensure compatibility between electronic identifiers and readers and ISO standard 24631 lays down the test procedures for conformity and performance of electronic identifiers and readers. Quality standards for conventional plastic eartags were also published by ISO in 2006.

2.9 International Trade Aspects of AI & T

The movement of livestock and their products has increased due to globalization of trade. One of the side effects of the movement of and trade in live animals within countries, and more importantly between countries, is spreading of animal diseases. As a consequence of animal trade and movements across borders, we have outbreaks of new and exotic diseases, and the spreading of existing diseases to new regions or animal species within countries.

Today, as the number of WTO member countries (160) and the number of aspiring countries covers the whole globe, the international trade of food products is rapidly changing and Tariff Barriers no longer represent a major limitation for market access. Non-Tariff Barriers (NTB) have emerged during recent years as a key tool for the international trade of agricultural food products. Among NTB, Sanitary and Phytosanitary (SPS) standards and related traceability protocols are playing a leading role in the international trade of food products. The SPS measures are applied to protect the life and health of humans, animals and plants from certain specific SPS risks within the territory of the importing country, but at the same time be least trade restrictive. In response to the concerns that market access may be limited by use of non-tariff trade barriers, the WTO's Agreement on the Application of Sanitary and Phytosanitary Measures applies rules to the use of non-tariff trade barriers (e.g., traceability and identification requirements) to restrict market access. Traceability measures, when applied to imports, must meet two requirements:

- Any traceability requirements must be scientifically justified based on an assessment of risk to human, animal, or plant health.
- They may be equivalent to, but not more rigorous than, the standards applied to domestic industry.

Traceability is not directly mentioned in the SPS Agreement and, accordingly, if a traceability requirement is adopted for or against any of the aforementioned objectives or risks, respectively, it could certainly be considered as a SPS measure.

Equivalence is a trade-facilitation tool whereby the exporting country demonstrates that the measures applied to its exports makes possible to achieve an equivalent level of health protection as in the importing country. If equivalence is accepted, the importing country agrees with the exporting country's standards and methods. An importing country should not require higher standards from the exporting country than those in place for domestic or national production.

In the global marketplace, animal disease programs, aided by traceability systems, are used both to reassure buyers about the health of export animals and to satisfy foreign veterinary and/or food safety requirements. Animal diseases have the potential to significantly impact international trade. As a result, many countries worldwide have put in place AI and T programs. However, AI and T import requirements should not be viewed by exporting countries as a trade concern, but rather a way to strengthen their national food production systems, which makes them more competitive in the international arena. AI and T requirements are important for current and future bilateral trade negotiations. The lack of a proper system of AI and T may result in a loss of competitiveness and access to certain markets. Each importing country enforces its own system based on its specific goals, but those systems may not, necessarily, be the same among countries. Traceability systems applied by major beef importing countries typically respond to needs such as animal disease control and food safety assurances.

Export Certification is frequently part of export verification processes imposed by importing countries. Although each specific country can have its own specific importing requirements, certification generally refers to the idea that animal production methods comply with the importer’s veterinary, animal health, and sanitary standards. This often involves sanitary sampling and inspection by the importing country. The OIE contributes to harmonization of international certification standards through its various programs and via the promotion of transparency and reliance on scientific information as a basis for evaluation. Chapter 5 of the OIE’s Terrestrial Code presents the general obligations related to certification as well as certification procedures.

A new and emerging concern is that AI and T may soon become not just an animal health and food safety management tool, but a market access requirement, as well. In several countries with large animal populations, such as Australia, Canada, the European Union (EU), Japan, and South Korea, animal AI and T is mandatory. Any developments that occur in domestic or international markets with respect to animal health, food safety and importation standards have also a potentially significant economic importance for Ethiopian livestock production. On the other hand, not all countries with large animal populations have on-going AI and T programs. Such examples include Bangladesh, India, Indonesia, Russia and Ethiopia. Many of these countries have large territories consisting of mainly agrarian rural populations. Several of these countries lack national distribution chains for animal products and, instead, rely on local production and marketing processes.

3 GENERAL GUIDLINES FOR ESTABLISHMET OF ANIMAL IDENTIFICATION AND TRACEABILITY IN ETHIOPIA

3.1 Why AI, MC and T? The role and benefits of the system

Why animal identification, traceability and animal movement control? What are their potential benefits? Who are the potential beneficiaries?

The role of traceability became particularly important after the bovine spongiform encephalopathy (BSE) crisis in the United Kingdom and the outbreaks of E. coli infections in the USA. The perceived threat of food-borne diseases has emphasized the need to trace farm products from "farm to fork". A second aspect of traceability is market access and certification. It helps eliminate trade barriers by allowing countries wishing to export animals or animal products to give assurances regarding their health and safety. A third aspect is related to disease prevention and control. The success of such programme is highly dependent on the ability to trace an infected animal back to its origin. A sound traceability system provides information that enables animal health officials to trace the movement of diseased animals, and to identify and contain other animals which were potentially exposed. It helps countries to put in place measures such as surveillance, early detection and notification of outbreaks, rapid response, and zoning or compartmentalization. The reasons for identifying and tracking animals and their products have evolved and include rapid response to animal health and food safety concerns.

The current focus of AI and T system in most of the countries is animal health, where traceability is limited specifically to movements from the animal's point of birth to its slaughter and processing location. In other countries such as the European Union (EU), Japan, New Zeeland and South Korea, the focus of animal ID is both animal health and food safety. As a result, those countries have more comprehensive traceability systems that extend beyond the processing plant and follow animal products (marked with an animal-specific bar code) all the way to the retail consumer. An AI and T system should enable an animal product to be traced back to the animal's farm of origin and to be identified throughout the food production chain. Traceability constitutes the bridge between animal health, food safety and the organoleptic characteristics of food linked to its origin. In response to disease outbreaks or in the context of disease prevention, traceability is important to countries wishing to establish veterinary measures, including surveillance, early detection and notification of outbreaks, rapid response, control of animal movements, and zoning or compartmentalization. Zoning and compartmentalization offer benefits to countries that cannot eradicate serious diseases throughout their territories, and effective AI and T systems are required to implement both zoning and compartmentalization. They can also help eliminate unjustified trade barriers, because an efficient AI and T provides the trading partners with guarantees regarding the safety of the products they are to import. For food products traded internationally, it is an important goal to harmonize national standards for AI and T and to make a bridge between live animals and their products. According to OIE recommendations, the benefits of AI and T should be utilized in key activities such as:

- Management of disease outbreaks and food safety incidents;
- Animal movement control;
- Vaccination programmes;
- Surveillance;
- Early response and notification systems;
- Inspection;
- Certification;
- Zoning and compartmentalization;
- Fair trade practices;

– Use of veterinary drugs, feed and pesticides;
– Herd/flock husbandry and
– Cost benefit studies.

Effective AI and T systems are the basis of effective animal disease control systems. They are key components of good disease surveillance and, during outbreaks, tools for establishment of:

– Rapid identification of all livestock at risk;
– Locating all susceptible species within the geographic region;
– Forward and backward tracing of all movements of susceptible animals into and out of the area;
– Implementation of animal movement control, and
– Effective resource deployment.

It would be a mistake to view AI and T systems as a burden. Instead it should be taken as a real opportunity for improving animal production systems and for bringing further benefits to society. The implementation of an internationally acceptable animal identification system provides an additional credibility as a potential trading partner to a national programme. Food chain traceability is primarily a risk management tool that is intended to play a part in enhancing food safety and consumer protection through processes which allow for the tracking of potential risks throughout the food chain, while concurrently tracing the source of the potential risk back to the live animal, to ensure its elimination. That change was fundamental to the restoration of consumer confidence in the safety of beef. Consumption had fallen by almost half at the height of the BSE crisis. Only when consumers were reassured that measures were in place which guaranteed the source of beef, did demand for beef recover. Today, BSE is no longer a consumer concern.

At the national level AI and T will provide long-term security to the livestock industry by facilitating the maintenance of export markets and assisting producers in the competition to enter new markets. For the government, the greatest benefit of AI and T is that it provides clear information about the demography of the livestock and accurate animal disease information to help with disease control. For instance, a simple tamper-proof identification system is available to the police and other government agencies concerned with livestock ownership.

3.2 How? The Elements of the System of AI, MC and T

The principles of a traceability system are based upon the identification of individual animals or homogenous groups of animals, the ability to track their movements and use, the proper identification of their premises and the recording of that information in appropriate registers. During the development and the implementation of identification and traceability systems, it is essential to establish a bridge between live animals and their products, based on a faultless system throughout the animal production and food chain "from farm to fork", respecting the standards of the OIE and the CAC. Many factors influence the design of animal AI and T systems at the national and regional level. Relevant factors at the national level include the animal and the public health situation in the country; animal population parameters (such as species and breeds, numbers and geographic distribution); types of production; animal movement patterns; available technologies and particularly their cost, the organization of trade in animals and animal products, and the priority species and sectors to be addressed. The design of animal identification and traceability systems should take into account the cost and benefits of different models, as well as economic, geographical and environmental considerations and, more importantly, societal and cultural aspects.

Another application of AI and T systems is in epidemiological investigations during disease outbreaks, when veterinary services urgently investigate the causes of an outbreak event. Those investigations need reliable epidemiological data about the history of animals (origin, movements, etc.), detailed information related to their contacts (with other susceptible species), and places where they have travelled. Tracing backward and forward are key elements in any epidemiological disease investigation. The use of traceability in the field of animal health includes other activities, such as management of epidemic emergencies, targeted vaccinations and culling activities to eliminate a disease. AI and T systems have been demonstrated to be very useful in the monitoring and assessment of the quality of vaccination and testing programs against animal diseases, such as foot-and-mouth disease, brucellosis and tuberculosis.

3.3 Legislation

Similar to other activities of the competent authority (CA), it is imperative to establish a national legislation for the implementation and enforcement of animal identification and traceability within the country. This legal framework should address several elements, including the objectives, the scope, the animal species involved, the organizational arrangements, the choice of technologies for identification and registration, the obligations of the involved parties, confidentiality, penalties, issues related to access of information, methods of information exchange and equitable means for financing programmes.

The OIE and the CAC recommend that legal frameworks should be developed in consultation between the relevant governmental administrations or agencies and the private sector, including beneficiaries and stakeholders. A basic step in implementing an AI and T system is a review of the existing relevant legislation and, on based on that, the explicit appointment of a CA. Consequently, the details of the programme can be implemented in accordance with the responsibilities of each participant, compulsory documentation, movement control of animals and animal products, and the system of registry and data bases. In other words, all programme actions must be clearly developed in relation to their legal framework if they are to be consequently implemented in the field.

3.4 Animal Movement Records and Documents

3.4.1 Animal Movements

The movement of animals refers to: "*movements beyond farm boundaries, irrespective of destination or, in the case of transhumance, the movement of animals when they change their grazing region"*. In case of a particular emergency situation, when information on animal movements must be provided within a specific time period, the shorter the time period for retrieving such information (for example, 24 h in the case of FMD), the better one will be able to stop the spreading of the disease through the movement of animals and animal products. Therefore it is very important that the relevant databases can be promptly checked. It is important to establish if the available resources are capable of supplying the necessary information in a timely fashion.

3.4.2 Documentation

The "Movement Documents" refers to the documents which should accompany the animals during their movement outside a holding, for the purpose of their identification and traceability. This is another basic issue in the implementation of traceability systems, disease prevention plans and other animal health measures. Usually the first step is to review all existing documentation, such as notifications or reports of suspected cases, farm inspection reports, documents on the movement of animals and animal products, etc. The location of such documentation and its degree of accessibility must be noted and, if necessary,

modifications should be made to bring it in line with the requirements and objectives of the traceability system adopted. Documentation requirements should be clearly defined and standardized, according to the scope, performance criteria and desired outcomes, and should be supported by the legal framework. Available information must be collected in order to determine the location of all establishments where animals are sold, as is the case with transport enterprises. Such central register of all establishments may also contain information on animal movements into and out of the establishments, but in any event, such information must be held by the establishments themselves, so as that they can use it for epidemiological analyses in order to plan preventive action; when a disease event occurs, additional information may be requested in order to trace the origin of the problem and avoid its spread. Each time new information is collected, the corresponding registries and databases should be updated accordingly.

3.4.3 Registration of animal movements

The identity of farm animals shall be made plausible through means of identification and movement documents. The relevant documents, registries and databases should be analysed, as well as the way in which they interact with each other within the existing legal framework. The registration of animal movements is necessary to achieve animal traceability. When an animal is introduced into or leaves an establishment, these events constitute a movement. Some countries classify birth, slaughter and death of the animal as movements. The information registered should include the date of the movement, the establishment from which the animal or group of animals was dispatched, the number of animals moved, the destination establishment, and any establishment used in transit. When establishments are not registered as part of the animal identification system, ownership and location changes constitute a movement record. Movement recording may also include means of transport and the vehicle.

Two technology developments are revolutionizing the recording of data and the provision of information. The first one is the handheld computer or PDA for collecting data, which plays a major role in reducing the cost of data collection, improving the accuracy of the resulting data and enabling farmers to be more profitable. The second technology is the internet. The use of the Internet results in a large number of access points to the database, including a direct connection to any farmer with internet access, a much easier change of management, as the software needs to be updated only in one place, a lower cost of information distribution, as much of it is electronic and the person seeking it has direct access to it, and a lower cost of data collection, as in many cases the person originally collecting the data is the person adding it to the system.

3.5 Equipment for Animal Identification

Different equipment for animal identification is available on the market. It is sometimes difficult for potential users to understand which equipment best suits their application needs. Therefore, certain standards have been developed for the identification of animals and the testing of identification devices. Additionally, not only has the technology itself been standardized, but also a system has been developed for giving a unique identification number to every individual animal worldwide. The International Committee on Animal Recording (ICAR) Guidelines describe the general requirements for identification systems. In close cooperation with each other, ISO and ICAR have developed protocols for testing and approval of identification devices, with the intention to ensure compatibility between equipment and information, and to protect national authorities and farmers, as end-users, by identifying good quality devices. ICAR has approved, so far, 346 products from 114 manufacturers, and information regarding these products can be found on ICAR's website (www.icar.org). Permanent identification devices can be divided into two categories:

- Simple identification devices such as conventional plastic or metallic eartags, which may have both visual and machine readable symbols (e.g. numerals and barcodes).
- Electronic identification devices like RFID transponders and the corresponding transceivers. RFID transponders used in animal identification are:
    - Injectable transponders.
    - Electronic eartag transponders.
    - Electronic ruminal bolus transponders.
    - Tag attachments.

In each country it is necessary to, first of all, set the objectives of a traceability system, which is a tool for carrying out various activities, such as prevention, control and eradication of diseases or health certification. It must be clear that AI and T are not an end in themselves, but rather means or tools to achieve given objectives. Therefore they should not exceed the cost of the objectives they serve.

3.5.1 Visual identification devices – plastic eartags

Conventional ID technologies, based on visual devices, have their place as a starting point in the identification of animals in countries which are taking their first steps in the implementation of ID systems. The ICAR is defining plastic eartags as permanent visual devices composed of three principal features:

- The front plate which is often, but not always, the 'female' component of an eartag combination.
- The front plate is designated as such because it will be in the front of the animal's ear when the eartag combination is applied correctly.
- The rear plate which is often, but not always, the 'male' component of eartag combination. The rear plate is designated as such because it will be at the back of the animal's ear when the eartag combination is applied correctly.
- The locking mechanism which is comprised of the locking gap in the female component of an eartag and the pin of the male component of the eartag combination.
- The manufacturer is deemed to be the company or the person who is submitting the application for an eartag approval and has accepted the ICAR conditions for production control, as outlined in this document.
- The color of the eartags used in the laboratory tests must be yellow and the print must be black. On the test tags the manufacturer must print a uniform solid square (10mm x 10mm in size), which will be of the same color as the color of the print on the tag.
- The print must consist of four different, predefined digits/numbers (from 0 to 9), which have been written/printed in bold Arial style.
- Each number/digit must be separated from the next one by a blank space of 2mm, so as to enable the assessment of the eartag for readability (so as to enable an easy assessment/readability of the eartag).
- The size of these digits/numbers must be the maximum size which allows the four digits/numbers to be (printed on the same line of the eartag in accordance with the above specifications) printed according to these specifications on the same line on the eartag.

3.5.2 Electronic identification

Currently, low frequency RFID technology (Radio Frequency Identification Devices) is generally considered as the most efficient technology for identifying animals. The RFID transponder itself does not give any information about the animal, but it is just a link between the animal and the animal information inside a database. The Database is a tool for storing

large volumes of data in a way which facilitates rapid access, high level of data integrity, minimal duplication of data storage and, more importantly, of data collection, and consequently, low cost. The database can be an on-farm or a central national database. The preferred option is a central database because tracking and tracing is much quicker and more effective, and other systems (such as herd book, animal health service) can be easily linked to it.

Generally, RFID eartags and boluses are used for identifying livestock, while injectable transponders are used for identifying companion animals, horses, fish and endangered species. The use of implantable microchips has increased since these provide a unique and tamperproof means of permanently identifying animals. These chips are glass encased passive transponders, i.e., they must be energized from outside for the information encoded on them to be released. This information is usually just an identification number but some of the newer microchips will also indicate the body temperature of the animal. The microchips and scanners are relatively expensive but are very useful where positive identification of valuable animals is required.

The downside of the electronic identification is that the most RFID equipment is not widely available on the market and there are frequent equipment break-downs in conditions of rough farm terrain. Secondly, the RFID identification devices cost 2 to 3 times more than conventional visual eartags, so RFID readers add an extra cost of several hundred US Dollars per piece to the system. Also, the installation and customization of readers must be done carefully to assure minimum distance between transponder and reader.

It can be summarised that RFID is generally considered as the most efficient technology for identifying animals. It is usually used as a secondary system or an upgrade to an already established visual system of AI, and it is fully beneficial on large farms and establishments (e.g. dairy farms, abattoirs etc.) with many operations and manipulations of animals, because it reduces significantly the labour for record keeping, reading errors and updating of databases.

3.5.3 Numeric systems and codification

The principles of numeric systems and codification of plastic eartags as permanent visual devices are, more or less, similar in all countries implementing AI and T systems. In most cases the print on the eartag consist of the logo of the “issuing agency” or competent authority, country ISO letter codification (e.g. NZ, USA, CZ or ET in the future) and an 8 to 15 digits animal individual number, depending on the country’s codification scheme and the total number of animals in the system. In some cases the first 3 digits are the country ISO numeric code (e.g. 840 for USA, or 231 for Ethiopia in the future). Most countries use one check digit or working number and print the four last digits in larger size of the same font for easier on-farm reading. Some countries have their national emblem engraved or printed on the eartag as well.

The recommended codification rules for plastic eartags as permanent visual devices are:

- The animal's official identity and identification number must be unique to that animal nationwide;
- Where the identity of an individual animal is not unique, the record must so declare it (e.g. flock identities for goats/sheep). The identity number used for a flock or herd must be unique to that flock or herd nationwide;
- The animal's identity must be visible;
- The animal's identity should never be re-used;
- The animal's identification device/method must comply with national legislative requirements;

3.5.4 The use of internet and handheld computers (PDA) for AI and T purposes

3.5.4.1 PDA

Today's widely used smartphones can all be considered as PDAs. The development of communication technology and its affordability and user-friendliness are making it available to all consumers around the world. This development logically leads to its application in AI system operating solutions. This particular technology enables AI operators to visit farms or operations such as livestock markets and abattoirs where there is no internet or even mobile phone coverage and to capture data during their visits. In cases of existing eartags with barcode, the handheld computers (PDA) can be equipped with barcode readers to speed up the reading process and to minimize errors. This technology plays a major role in reducing the cost of data collection and in improving accuracy. Prior to visiting each farm, the AI operator can populate or pre-program the handheld computer with records of all animals known to be on the farm, and then during the visit to the farm he/she can record the details of each animal he/she has checked. This population process and upload subsequent to the farm visit, requires the AI operator to have access to internet or a mobile phone network. The AI operator is then able to validate the identification of all animals checked or serviced. Prior to the availability of this system, data collection was paper based, it used to take several days, even weeks for all of the data capturing to be completed and it involved such high levels of animal identification errors that the data could only be used for billing purposes.

3.5.4.2 Internet

The second technology that revolutionised the use of integrated AI and T is the internet and the world-wide-web applications. Prior to the use of the internet, there were a small number of access points to CDB. Only a few people could access to data directly, resulting in both higher costs for information distribution and higher costs for data collection and entering. Since the beginning of the use of internet applications, there is now a large number of access points to the CDB (including directly by any farmer with internet access), a much easier management of changes, a lower cost of information distribution, which is now mostly electronic and can be accesses directly by the person seeking it, and there is also a lower cost of data collection, as in many cases the person originally collecting the data is the person adding it to the system.

3.6 Central Data Base CDB (Architecture, Basic Requirements)

A national database for animal identification combined with traceability, accessible via a high-speed computer network, is considered to be the ideal system to permit quick response to an animal disease outbreak or the incident of contaminated food, so as to limit hazards to human or animal health and to minimize economic loses. Different versions of fully operational AI and T systems currently exist in many countries, with differences based primarily on the amount and type of information collected and the extensiveness of the traceability systems. The CDB must be able to supply at any time a list of identification numbers for all animals (species included in the system) present in a holding, and a list of all the changes of holdings for each animal, starting with their holding at birth or their holding at the time of importation.

CDB General Data Requirements are:

- To have the potential for linking to traceability in other parts of the food chain;
- To minimize duplication;
- To have compatibility of relevant components, including databases;
- The confidentiality of data;

- To have appropriate safeguards to prevent the loss of data, including a system for backing up the data.

The CDB stores data related to holdings, keepers, animal registrations, movements, animal deaths, eartags, replacement eartags, issued movement documents and replacement documents, animal premiums granted, public service organizations and their individual employees (markers), data inserters. Data quality is improved by implementing a number of plausibility checks in the software (before - plausibility checks at data entry, and cross-checks at later times). Strict validation procedures are implemented at data entry, forcing the technicians to resolve errors prior to data entry.

The owner of the CDB can be a government or a private organization and it is even possible to maintain databases at farmer level. A country may use several databases, one for companion animals, one for horses, one for sheep, one for goats, another one for cattle, etc. Different organisations can be responsible for the different databases. There could be multipurpose animal databases including different types of information: traceability, yield records, various veterinary treatments, etc. The interoperability between separate databases in order to allow electronic data exchange between them is paramount.

Operational AI and T systems should at least collect and store information concerning the animal's place and date of birth, the name and address of the owner, the date and location of movements between the animal's origin and its place of slaughter, and the date and location of slaughter.

The AI and T systems include information about the sex, breed, and parentage of an animal, the names of all feeds and pharmaceuticals used in raising the animal, and the movement of specific animal products from the processing plant to the retail consumer.

The register of holdings and keepers (RHK) should be a standalone module, serving as a multi-purpose register. It should be possible to link every other veterinary database (or agricultural database) to the RHK in such a way that data are used directly from the RHK. For instance, the sheep and goat AI systems will use the same RHK software developed for bovine animals. The RHK thus presents the basic module in the system. The module consists of the database, data integrity control mechanism, and the user interface. The user interface should provide functionality, so that keepers and holdings could be entered regardless of the registration purpose. The module should provide feasibility to record details of all establishments where animals are located, including slaughterhouses, markets, quarantines, holding grounds, pastures, shows, exhibitions, sporting events, etc. The type of holding should be recorded in the database. Other classifications of holdings may be necessary. For instance, a holding can be of a permanent or temporary (pastures, shows) type. A holding can be a regular holding which has been registered according to the prescribed procedure or can be an establishment entered into the database in another fashion. Registering transporters should also be possible.

A single keeper is appointed to a holding and a keeper may have several holdings under his control. In the case of individuals, an official personal identification number or tax number (preferably both) should be included. Provisions for change of keeper or death of the keeper should be included, without having to delete the previous keeper. Links to other national registries should be considered (especially the register of spatial units and the central register of citizens) for the purpose of crosschecking.

3.6.1 Markets, mountain pastures, traders and transporters

If an animal is sent to the market, is not sold and then returns to its original owner and location, the movements to and from the market should be recorded. If an animal is sold via

a dealer, the movement to the dealer and from the dealer to the final owner should be recorded, regardless whether or not animals were kept at the dealer's stables. The transporter needs not be recorded, but is still obligated to keep a record of animals transported. The software should support simple reporting by the market operators. The database should record details of all transport vehicles.

3.6.2 Information analysis and traceability

Besides recording animal movements, the most important activities for achieving traceability are keeping up-to-date records of diseases and other health-related events and maintaining accessible data on diagnostic laboratory results. This data is enabling Veterinary Services to carry out tasks for prevention, control and eradication of animal diseases and international certification. The selected systems which have been designed to enable this analysis may differ from country to country, but it is always necessary to have access to information and to registries. Some countries may establish centralised databases containing all necessary information, while others may establish regional or local databases. No single model is advised, but it is obligatory for health and certification programme officials to have access to necessary information.

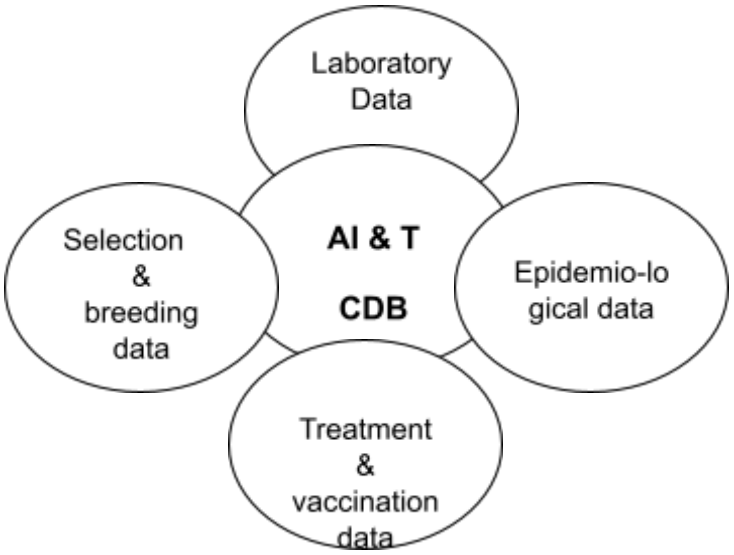
3.6.3 CDB Accessibility

Different types of users should have different privileges to access data. For instance all CA staff should have full (read only) access to the CDB. The information stored in the CDB is strictly confidential and it is usually regulated in accordance with personal-data-protection legislation. The CDB data cannot be used for taxation purposes.

3.6.4 Inter-operability of CDB

The different applications (AI, Animal Health, Laboratory Information System) can, on one hand, be regarded as providers of information and on the other, as consumers of information, depending on whether they request or provide information. The inter-operability must offer a platform which enables consumers and producers to exchange their information. This approach is important as more databases and modules evolve from different Ministries' activities (subsidies, agriculture data etc.) It is not acceptable that each department keeps its own holding registration system. This would mean that another module is necessary that links the different holding registration systems, and that the farmers use many different holding numbers.

Figure 1**: AI&T CDB System and depending applications**



3.7 Controls of the System of AI and T

The control of the AI and T system should basically consist of:

- Control of transport;
- Control of livestock markets;
- Control in the slaughterhouses;
- Control of implementation of veterinary activities;
- On-spot control of holdings and establishments (farms, feedlots, holding grounds).

The monitoring activities shall include, *inter alia*, checks of the professional competence of authorised organizations, including suggestions for action and deadlines for the removal of observed irregularities.

The CA should carry out the controls based on risk analysis which has taken into account all of the important factors, including the number of animals in a holding and the number of animals identified in a holding, human health, animal health, significant changes in comparison to the previous years, results of controls carried out in previous years, especially keeping the registries, proper keeping of animal documents and proper communication with the CA. In principle, the check-ups are usually not announced in advance, but in case of announced check-ups, the deadline of 48 hours should not be exceeded. After each inspection/control, a standardized report should be prepared, stating the results, the reason for the inspection and the unsatisfactory findings.

3.8 Stakeholders

When introducing an AI and T system, in order to have it accepted it is essential not to impose excessive demands on the stakeholders in terms of administrative formalities. Therefore, it is extremely important to build into it direct benefits for the players along the chain! AI and T is a comprehensive system that clearly requires a huge investment by all parties. It is important that the investment is worthwhile and that it represents value for money. In turn, this requires a continuous reappraisal of the costs and benefits. For a sustainable, successful outcome of the AI and T implementation, responsible national and regional stakeholders have to be involved from the beginning. Continuous exchange of ideas and discussions are important from the first identification and planning phase.

Many stakeholders see the introduction of an AI system as an intrusion which is unnecessary and too bureaucratic. It will therefore be essential to get all the stakeholders on board right from the beginning of the project. Failing to do so will result in a serious delay in project implementation and will jeopardize the sustainability of the project results.

Central to the development of effective animal identification and traceability systems is the direct involvement of and commitment to the process by the different stakeholders in the country involved. While the veterinary authority in the country may very well be aware of the potential benefits of effective animal identification systems, it is only with the commitment of animal keepers and industry representatives to the development and maintenance of the system that there is any prospect for success. The imposition of a 'top-down' system by government and veterinary authorities will quite simply not work, unless both the farmers and the livestock industry in general, understand what is involved and are prepared to work with the veterinary administration.

Farmers and operators all along the food chain must be informed of the benefits of identification and traceability, and must be motivated to comply with the programmes implemented by the government authorities and, particularly, with the MC and MC documents. Animal owners must be identified, along with the farms on which their animals are kept, since they shoulder primary responsibility for animal management and notification of disease events. In the final analysis, the owner is legally responsible for compliance with standards, and up-to-date data is needed for each one. The owner of an animal and the owner of the farm on which it lives, are not necessarily one and the same person. For all the reasons which have been set forth above, it is important to know the geographical location of a farm; the identity of the owner is, however, no less important, albeit for legal rather than epidemiological reasons. In the case of voluntary AI and T programmes, poor adoption by farmers is one of the main reasons for failure. Many of these programmes collect data for purposes such as research and progeny testing, without providing any direct benefit to the farmers, such as milk recording data that can be used for ration formulation or reproduction management. It is therefore crucial that such programmes provide feedback and demonstrate direct benefit to farmers. Farmers may also feel that their privacy is being intruded upon and that the confidentiality of their information is not being respected, and may therefore not participate.

These lessons present a sound basis for identifying the requirements for sustainable AI and T systems. A major prerequisite for the success of AI and T programmes is long term commitment by the users and those providing financial and technical support, which are mainly the government and farmer cooperatives. Failure to secure such commitment will inevitably result in poor sustainability of the system.

4 Assessment of the current situation in the sector

4.1 Introduction

There is no single model of AI and T and no ready to use system is available for all countries and every country should develop its own system based on the international standards and recommendations given by the OIE, CAC, with perspective on the WTO SPS agreement and the international trade rules.

In order to have a “reality check” and design operational concept suitable for Ethiopian relatively difficult conditions and limited resources, the AI, MC and T STE carried out two week field mission with objective to assess the specific characteristics of the pastoral and agro-pastoral production systems of the eastern and southern lowlands, “kola”, as well as the intermediate, “woina dega”, zones of Ethiopia, the main regions from which animals are sourced for export. The assessment was done principally paying attention on AI, MC and T aspects of the livestock sector and activities of institutions and stakeholders. The field mission included visits to export feedlots in Adama wereda, Oromia region, Export quarantine in Mille – Afar Region, export abattoirs in Modjo and Debre Zeit (Oromia region) and final livestock markets in Borana Zone. The expert carried out extensive meetings and interviews with different levels of veterinary service personnel responsible for movement control, slaughtering and certification of export of animals and meat, regional and local officials and various institutions and stakeholders in the process of export of live animals and meat from Ethiopia. During the interactive interviews and discussions with different level veterinary officers and different stakeholders various ideas and possibilities for establishment of animal identification and traceability system for export were proposed and discussed, particularly taking into consideration specifics of Ethiopian livestock production systems.

4.2 Secondary Livestock Markets (SLM)

The field mission visited Elweiya and Dubuluk the largest two out of seven secondary livestock markets in Borena Zone. All seven secondary livestock markets have been recently reconstructed with support of different USAID and JICA projects. They are usually fenced, have weighing scales, feed and watering facilities and have a capacity of up to several thousand animals and are managed by the newly formed Zonal Agency for Markets with head office in Yabello. Every secondary market has a different market day during the week. Supply of livestock to the secondary markets is mostly done through trekking, rarely by vehicles. Primary markets are village level markets with a supply of less than 500 head of cattle/week where farmers and pastoralists sell animals to first hand traders, to other farmers for replacement animals and to local butchers. Traders, and rarely farmers, use traditional stock routes to trek their animals to the markets. From the pasture area or primary livestock market to the secondary market, cattle can be trekked daily up to 40km and sheep and goats up to 25km. Resting points are chosen on customary practice but may change depending on the season and security. Both visited secondary livestock markets are linked to the main road by non-asphalted road passing through the village that have same market day for other goods. In Elweiya the road is not yet constructed and it is not accessible for trucks so regardless of existing ramps, sold animals are walked to the main road to be loaded on trucks to feedlots and other directions. The same market doesn’t have water and power supply yet. Animals enter on one side in three separate pens, one for camels, one for cattle and one for sheep and goats where actual negotiation and bargaining is done by traders. At the end, animals exit on the other side of the pens where tax per head of animal is collected by agents of secondary market authorities, belonging to the State Agency for Markets.

4.3 Veterinary Control at the Secondary Livestock Markets

There is no requirement for livestock movement permits or any other veterinary document and farmers or traders freely move animals and enter secondary markets without obligatory veterinary control. An animal health assistant is present the market day, mostly selling veterinary products from small building designated as veterinary clinic. There are designated pens for detention of sick animals and sometimes the AHA treats the animals if necessary. No other biosecurity measures such as clinical or documentary check of animals or any disinfection before entrance are applied at the markets. Animals leave the markets without veterinary check, movement document or check of the vehicles.

In the design of the SLM very little attention has been paid to the biosecurity measures, so additional attention should be given to the following issues:

- The connection roads are passing right through the densely populated areas with animals and people and are not suitable for larger vehicles for transportation of animals;
- SLM have other infrastructure problems such as water and power supply.
- No disinfection is foreseen for animals, vehicles and visitors of the SLM.
- No veterinary document is required at the entrance and no veterinary document is issued at the departure of the animals.
- Veterinary presence at the SLM has a more commercial interest rather than control or regulatory.

4.4 Borana Zone Institutions Managing Secondary Livestock Markets

The field mission visited Zone Pastoral Development Office in Yabello, Borana and had meeting with officials. The system of notification of diseases and reporting system for veterinary activities were discussed as well. The officials introduced the mission to the system of local trade and livestock markets and high demand of livestock markets at the grass-root level. Together with the zonal DVM, they explained the organisation of the veterinary service down to woreda and kebele level, the role of AHAs and lack of DVMs. Extensive discussions were carried out also on different possibilities and difficulties for starting of AI at the secondary livestock markets.

The mission visited the Zone Agency for Markets, a newly formed regulatory body, responsible for management and operation of the seven SLM. The head of Agency expressed high interest in establishment of animal movement control and identification of animals so animals can arrive at the SLM with prior veterinary check and movement document. He also welcomed the idea of establishment of disinfection facilities at the markets. He stated that this will reduce the risk of entering of diseases and increase security at the SLM and offered full logistic and support by Agency for implementation of the AI at the markets including offices and storages for the means of identification. At both Dubuluk and Elweiya SLMs, mission had meetings with local market managers operating under Zone Agency for Markets.

At the Elweiya SLM, the mission meet the town administrator (the Mayor), who stated the importance of the market for the town economy and fully supported the presented model of AI and T starting at the secondary market. He stressed the importance of inclusion of the local veterinary staff in the implementation of the system, particularly having available DVM.

4.5 Secondary Livestock Market Stakeholders

In Yabello the mission visited a livestock trading enterprise which trades animals between the SLMs and EFLs near Adama and Mojo areas and discussed with the owner and manager of the livestock trade company. He presented the system of trade from the farms and pastoral areas through PLMs and SLMs, to the export feedlots, explaining how his agents source animals and how the company keep records for the animals. According to him currently there are 3 to 4 animal traders with 50 vehicles trading from Borena SLM to EFL and approximately 35 exporters from EFL in Adama/Mojo region. He pointed out difficulties and problems of the business including lack of demand from foreign markets and the surplus of animal production in Borena region. He also stressed the problem of illegal cross-border trading with animals. The mission presented possible ways of establishment of AI, MC and T for the exported animals in order to access foreign markets and it was agreed that it is achievable goal for export cattle as a starting point for establishment of full system.

At two visited SLMs in Dubuluk and Elweiya, the mission met and interviewed different scale animal traders, from small first and second stage traders to big ones with transporting vehicles to EFL. The mission was introduced to the scope of their everyday work and problems they are experiencing. The biggest problem for the traders is lack of demand from foreign markets and surplus of animal production, resulting in low price of live animals and low earnings in trade. The pilot model of AI, MC and T of exporting cattle was presented and discussed for possible implementation, inclusion of stakeholders and expected problems. With minor comments, they all agree that establishment of an AI, MC and T system for exporting cattle is feasible and can be beneficial for participants in legal livestock trading.

4.6 Export feedlots (EFLs)

Four different export cattle feedlots (EFLs) were visited, near the city of Adama where most of the feedlots are positioned due to the availability of sources of animal feed (by-products) derived from the different feed / crop processing industries nearby. Besides hay, animals are fed on concentrates consisting of wheat bran, oil seed cake, molasses and essential minerals. Feedlots vary in capacity and size from several hundred, to several thousand animals. The majority of EFL are constructed one next to each other, in close proximity, in the same area and many new ones are in the phase of construction. Animals are sourced mostly from Borana secondary livestock markets by intermediate animal traders. No veterinary document accompanies animal consignments.

On arrival all animals are tagged with eartags with individual numbers by the feedlot workers. The size, shape and numbering of eartags are not officialised and they can be purchased freely at the market. All EFLs are under supervision and control of Federal Quarantine Veterinary Officers who are in charge of implementing all required veterinary and sanitary measures by the importing country. The principle of "*all-in-all-out"* is generally followed by consecutive mechanical cleaning and disinfection of premises. Veterinary activities demanded by importing countries such as vaccination, deworming and eventual treatments are performed by local DVMs or AHAs, hired by the owners of the feedlots under close supervision of the federal quarantine officers. The animals showing symptoms of clinical diseases are separated in designated detention pens and withdrawn from export. Some larger feedlots also employ DVM as well as AHA for their daily animal health service activities.

On the road to Afar, the mission visited one export sheep and goat feedlot that is one of the largest in the country with a capacity of 20,000 sheep and goats. At the time the local veterinary workers were vaccinating animals on site, supervised by an Animal Health Assistant from the Adama Quarantine Office. Sheep and goats are not identified by any means of identification and are placed in different pens, one next to another, separated only by a wooden rail fence. A small part of the EFL is designated for camels.

In general, EFLs are well constructed with satisfactory level of hygiene and sufficient labour, but the level of biosecurity is not sufficient to meet the requirements of quarantine prescribed by the OIE. The mission findings are following:

- There are many animals and herds grazing and passing by and EFL are not secured for preventing contacts with those animals;
- The most of the EFLs are placed in the same area neighbouring each other so isolation of the different batches of animals is impossible, particularly for air/vector borne transmission of diseases such as FMD, LSD etc;
- Disinfection is not performed for vehicles and materials and for the workers. Most of the workers are keeping animals at home and there is no procedure (e.g. disinfection, washing) for them to prevent transmitting diseases to quarantine animals;
- The principal of *all-in-all-out* is not always fully respected and it is unclear what happens with animals that are not suitable for selling like underperforming or diseased animals.
- The eartags cannot be used for official tagging since they are not officialised and can be purchased freely at the market allowing duplications and fraud.
- Sheep and goats are not identified by any means of identification.

OIE TAHC Definition: Quarantine station means an establishment under the control of the Veterinary Authority where animals are maintained in isolation with no direct or indirect contact with other animals, to ensure that there is no transmission of specified pathogen(s) outside the establishment while the animals are undergoing observation for a specified length of time and, if appropriate, testing and treatment.

4.7 Adama Federal Quarantine Veterinary Office

The office is keeping a register of all export feedlots and inspect their status and give their technical evaluation for the Main office, AHD, and the directorate write competence compliance letter upon the technical evaluation document per year, based on which the Regional/Federal State Investment Agency renew /gives licence to work. One DVM and 4 AHAs are covering approximately 120 EFLs in the region with only one vehicle. All documentation is done in writing in hard copy without computer for electronic documentation, archiving and reporting. In accordance with the requirements of importing countries, quarantine veterinary officers are enforcing different veterinary measures required by each importing country and issuing different international veterinary certificates (IVC) in the past for export of live animals to Djibouti, Egypt, Somaliland, Yemen and Oman as countries of final destination. Currently, they are only issuing IVCs for Djibouti and rarely for Somaliland (Berbera). According to the information gathered from exporters and from financial and customs documents accompanying consignments of exported live animals, the end country of destination is actually different from the one stated in the Ethiopian IVC. The exported animals go firstly to quarantine facility in Djibouti where the Ethiopian IVC is exchanged, after a short period, with Djibouti IVC, certifying that animals originate from Djibouti, not from Ethiopia. Then, the same live animals from “Djibouti quarantine” are exported to different Arab countries, including Saudi Arabia, Yemen, Oman, Dubai and Kuwait.

Due to the rapidly growing number of EFLs in the region, Federal Quarantine Veterinary Office in Adama, regardless of their professionalism and efficiency and good collaboration with stakeholders, cannot cope with the workload that is increasing on a daily base and on the other hand lack in human, material and legal powers. The limitations include:

- One DVM and 4 AHAs are covering approximately 120 EFLs in the region; It is crucial that AHD reinforce the Adama Federal Quarantine Office with sufficient number of DVM and other veterinary personnel in order to cover successfully such an important and growing activity under their responsibility.

- Only one vehicle, no computers or other hardware and software to support activities. All documentation archiving and reporting is done in writing in hard copy without any IT support. Veterinary officers must be mobile and equipped and trained to use IT solutions in archiving, documentation and reporting of their activities. This is one of the prerequisites for establishment of AI, MC & traceability.
- No requirement for animal movement documents, so all animals arrive in EFL without veterinary document, known origin and health status that is hampering further issuing of IVS.
- Federal Quarantine Veterinary Office is issuing competence compliance agreement, but it is not responsible for approving final opening of EFL, which is currently the responsibility of the State Investment Agency with no expertise in imposing biosecurity and other veterinary requirements;
- Quarantine officers cannot always rely on existing individual numbering of the existing eartags for cattle;
- Sheep and goats besides no movement documents are without individual or flock identification;
- Unclear and undocumented procedure for detained animals.

4.8 Feedlot Owners and Live Animal Exporters

In most of the cases the owners of the export feedlots are at the same time exporters of live animals. They are sourcing their animals in Borana secondary livestock markets, either by their own agents or by intermediate traders who select and buy animals at the secondary markets. The vicinity of sources of concentrated feed for animals from the local sugar and mill industry and low transportation cost of supply is main reason for concentrating export feedlots in Adama and Modjo area. The mission, accompanied by the Head of Federal Quarantine Office in Adama, carried out extensive meetings and interviews with both feedlot owners as well as with live animal exporters presenting the concept of animal identification and traceability and discussing possibilities for implementation of the system in Ethiopia. Some of them are well informed about AI and MC systems that are in place in other countries. During the interactive discussions, particular attention was given to the problems and limitations that can be expected during the implementation of AI system. In all contacts, there seemed to be a high level of interest and support for establishment of AI, MC and T, particularly as a prerequisite for export and opening of new markets for export of live animals. They expressed high interest in strengthening of official channels of export vs. illegal cross-border trade.

4.9 Mille Export Quarantine

The EQ is a huge operation in the last phase of construction positioned in Afar region, approximately 3-4 km from Mille, off the main road to Djibouti with a connecting road under construction. At the entrance of the EQ, it is foreseen to have one gate with disinfection waterbath for both entrance and exit of consignments of animals and employees. Two fences are planned to separate the EQ from outside environment. The outside wire fence has been destroyed partly from the side where river appears during rainy periods. Two large ramps, one for cattle and one for sheep and goats are constructed for downloading and uploading of animals, followed by large chutes separating animals arriving and departing the quarantine. The arrival chute has a disinfectant spray chute for arriving animals. There is no designated place for disinfection of vehicles and they all pass on the same route from the gate to the ramps, regardless if they are bringing or taking the animals from the quarantine. The pens for different batches of animals are separated by metal bars leaving open possibility for contact between animals from different pens. The concrete drinking troughs are constructed at the border between pens, separated by small wall. The shade areas for the animals are relatively small and don’t seem to be sufficient protection for the animals from the extreme hot climate conditions of Afar region. An animal waste canal is passing

between two rows of pens to collect and lead the waste to the collector, still under construction. The feeding is planned to be joint for all pens from outside feeding troughs. Three small buildings are under construction, intended for diagnostic laboratory, post mortem examination and veterinary clinic on the riverside.

The Mille export quarantine itself as an impressive and ambitious operation in the last phase of construction so it is not easy to give final comments on modes of operation, but some principal comments and recommendations can be useful to improve its functionality and reduce risks.

- Lack of water supply is seriously endangering all future operations of the quarantine, starting from watering animals in the extreme hot temperatures of Afar, to disinfection, cleaning, washing, functioning of laboratory, clinic and post mortem etc...
- The design of the quarantine is not allowing separation of different batches of animals so in order to achieve this important sanitary requirement, the quarantine must only work with 20 to 30 % of capacity, leaving empty pens between separate batches of animals.
- The routes of animals arriving and departing from the quarantine cross in several points:
    - Firstly, the entry gate is the same for all vehicles, consignments of animals and employees getting in and out.
    - Secondly, the loading ramps for animals are constructed more for livestock markets rather than for quarantine purposes as, the routes of arriving and departing batches of animals cross. Considerable quantities of disinfectant will be necessary for disinfection of those huge ramps and chutes.
- Designated place for disinfection of vehicles must be constructed and separation of entrance and exit routes with separate gates.
- The outside fences must be revised in order to secure separation from outside environment, particularly from flocks and herds passing by.
- Shades should be enlarged to protect the animals from Afar heat and exchange of drinking troughs with inexpensive automatic drinkers in order to preserve water and shedding of infectious agents.
- On its way to the septic pit, the animal waste canal passes between rows of pens and should be covered not to endanger other pens.
- A cost efficiency study should be carried out regarding the establishment of laboratory that is supposed to run validated tests for international trade purposes, particularly having in mind harsh conditions in Mille and the proximity of the Regional laboratory in Samara (70 km).
- At the moment it is difficult to understand the procedures of moving of animals through quarantine and separation of diseased animals without compromising other batches of animals and this problem must be seriously approached.

4.10 Export Abattoirs

The Mission visited three export abattoirs (EA), two in Modjo and one in Debre Zeit. As critical component of the system, all three export abattoirs were assessed by the STE mainly from the AI, MC and T aspects. The mission was hosted by federal veterinary officers designated in all three facilities. One DVM and several AHAs are designated by the Export

Abattoir Department of AHD to carry out all official controls and checks and to issue international veterinary certificate for export of meat and meat products. EA also employ one to two DVMs and AHAs as well as experts to control implementation of HACCP principles. Federal veterinary officers have offices and small laboratories for primary checks and investigations.

The access roads to all three EA are with lot of dust and crowded with many different animals passing nearby. The entrances of the EA are separated from the reception entrance for live animals and are also used by chilling vehicles transporting meat to the airport in Addis Ababa. At the moment, due to lack of market demand, only small ruminants are slaughtered. Two out of three visited EA have lines for slaughtering cattle, currently not in use. Sheep and goats intended for slaughter are sourced from primary and secondary markets and sometimes directly from farms. EA have their own sourcing agents and vehicles but also receive animals from other traders. All animals arriving for slaughter are without any veterinary document and any means of individual or group identification. They are unloaded at the reception depot and checked *ante-mortem* by the federal veterinary officer. The animals that are showing clinical signs of disease such as: coughing, discharge or diarrhoea are separated into detention pens and rejected from slaughtering. Then animals are moved to lairages and from there enter the slaughter premises.

All EA carry out Halal slaughtering procedures since the meat is intended for export to Islamic countries. All visited export abattoirs have certificate for implementing HACCP procedures. AHAs are present at the line of slaughter, after evisceration, checking internal organs for pathological changes. No identification of carcasses or numbering is applied or matching identification of viscera and heads of slaughtered animals. The sheep and goat carcasses after evisceration are washed, cleaned and disinfected with organic acid and stored in the chilling chambers. From there the carcasses are loaded in to thermo king vehicles and transported to the airport for export as fresh chilled meat. They are accompanied by international veterinary certificate issued by federal veterinary officers. Some slaughter parts such as brains, kidneys and intestines are separately washed, prepared packed and sometimes frozen before export. The management of animal waste and by-products are not strictly controlled and sometimes sold freely to the locals.

The comments and recommendations for export abattoirs are given only from the point of view of AI, MC and T aspects with no intention to cover other sanitary requirements.

- The primary problem in EA is arrival of animals with no veterinary document, with unknown origin and health status. The federal veterinary officers have problem issuing IVS since they have to certify that animals are coming from known animal health status and origin;
- The reception areas for live animals are not secured and batches cannot be isolated one from another including from outside animals since biosecurity is not fully implemented in this area;
- The access roads to all three EA passing through areas with many different animals passing nearby and need improvement in the dusty areas;
- The disinfection area at the entrance of the EA should be strengthened, with making waterbaths long and deep enough to soak properly the truck wheels and simple disinfection of hands and feet for employees and visitors, particularly knowing that many keep animals at home;
- Simple (paper ticket) number identification of the carcasses can help trace and match them with viscera and other by-products of slaughtering;
- The problem of management of animal waste and by products is serious and exceeds the mandate of this report.
- There must be a separate place with appropriate facilities for the cleaning, washing and disinfection of means of transport for livestock. However, slaughterhouses need not have

these places and facilities if the competent authority so permits and officially authorised places and facilities exist nearby.

Once again, it should be clearly stated and emphasized that assessment of all visited facilities and institutions was done in a very short time and mainly through analysis of AI, MC and T related aspects.

5 STRATEGY OF ANIMAL IDENTIFICATION, MOVEMENT CONTROL AND TRACEABILITY IN ETHIOPIA

5.1 Introduction

FDR Ethiopia and the neighbouring countries of the horn of Africa are at constant risk of and an exposure to a number of OIE listed diseases of major economic importance to ruminants. These include FMD, RVF, LSD, sheep and goat pox, CBPP, CCPP and peste de petits ruminants. It is therefore in both national and international interests that Ethiopia has an effective surveillance programme for the rapid identification of possible outbreaks of these diseases and appropriate national contingency plans for their containment and eradication in case of an occurrence. Due to the lack of appropriate livestock AI and T systems, the horn of Africa has the lowest share of world beef trade despite their huge population of cattle and small ruminants.

Starting with $27 million in formal live animal exports and $18.5 million in meat exports in 2005/06, the total value of livestock and meat product exports from Ethiopia reached $148 million in live animal exports and $63 million in meat exports in 2010/11. The estimates for the combined export of live animals and meat for 2012 are up to $300. Thousands of livelihoods are created and maintained through this livestock sector. That is what is at stake for Ethiopia if it is faced with outbreaks of major OIE listed diseases and the loss of export markets. As a trading nation with significant exports of both livestock and meat, it is imperative for Ethiopia to rapidly rebuild confidence in the animal health status and the safety of its animal products.

Today, according to all international veterinary and trade rules, it is unrealistic to expect that after a disease outbreak, trading partners will accept verbal or written assurances of freedom from disease and the safety of both live animals and animal products. Assurances and guarantees of health status must be supported and must be confirmable by reference to internationally accepted and recognised criteria, such as are found in the OIE *Terrestrial Animal Health Code*. The AI and T system can provide a way for Ethiopia's cattle industry to access international markets, and it is expected to be subjected to rigorous inspections by various trading partners. It has to be also compliant with OIE standards and guidelines on animal identification and traceability. The OIE defined and adopted General Principles, that animal traceability and traceability of products of animal origin should have the capability to be linked to achieve traceability throughout the animal production and food chain and should be under the responsibility of the Veterinary Authority. Regardless of the chosen final objectives of the AI and T system, in Ethiopia some common basic essentials recommended by the OIE, must be considered before its implementation. These are:

- Supporting legislation;
- Procedures;
- The competent authority;
- Identification of establishments/owners
- AI and animal movements.

If market access is the primary goal for the establishment of AI and T system in Ethiopia, then as system develops over time, further extensions must be added to the AI and T system. The operating system must be sufficiently adaptable (expandable) to allow its use beyond the abattoirs.

Another aspect that should be taken into consideration when designing an AI and T system in Ethiopia is the problem of cattle rustling, which like in most of its neighboring countries is a serious security issue of concern to relevant authorities. Large numbers of livestock and human lives are being continuously lost, particularly in the south along the border with Kenya. The introduction of an AI and T system as a tool for claiming ownership can be

potentially used in resolving some of the rustling disputes and problems. However, the tribal animal branding shall not be confused with the official system of AI and T in any case.

5.2 Cost Benefits of the System

A question has been raised about the cost effectiveness of such system and if the export markets which would be conquered in the future as a result of it justify the costs of its establishment and maintenance?

The cost of animal disease in terms of mortality, increased morbidity, and inability to trade in live animals and animal products must be measured against the cost of AI and T systems. If you factor in the potential loss of trade in live animals and animal products, the economic considerations become highly significant and the loss of income, not just in the livestock industry, becomes readily apparent.

The cost assessment requires a detailed description of the processes of the AI and T system, the tasks of the actors for each of the processes in order to evaluate the required amount of labour, the identification system, and the services such as mailing, communication, hosting and management of the database.

5.3 Ethiopia AI, MC and T Roadmap

Experience in many countries has shown that implementation of AI and T needs to be gradual and that it needs to follow established official animal disease control or food safety programs or strategies. The scaling-up in Ethiopia should take into account the capacity of veterinary service to comply with international standards of Codex and OIE (i.e. Sanitary and Phytosanitary Agreement by the World Trade Organization). The integration of all of the actors who are a part of livestock production value chain, in the process of design, implementation and evaluation is critical. Of particular concern are the smallholders, a sector which is the most vulnerable to the negative impacts of compliance to deal with animal disease control efforts and food safety threats along the livestock value chains. It is not reasonable to expect countries with limited resources such as Ethiopia, to create costly systems that mirror those in the developed world as a prerequisite to market access. To do so is to deny countries like Ethiopia the opportunity to develop at an appropriate pace. If additional measures are deemed necessary in order to provide an acceptable level of protection for the consumer in the developed world, then it seems entirely appropriate that consideration should be given to the transfer of both the required technology and expertise.

5.3.1 Short Term Animal Identification, Movement Control & Traceability Strategy in Ethiopia

The first phase is expected to last 2 to 3 years; during this period two main parallel projects should coexist and run in the beginning as separate activities, and should then merge at a later stage. They are:

- Establishment of Movement Control Documents.
- A Pilot Project for Establishing AI and T for export of Cattle and Beef.

The short term strategy activities are described in detail in later chapters of the report.

5.3.2 Medium Term Animal Identification, Movement Control & Traceability Strategy in Ethiopia

The medium term strategy relates to the period after the short term strategy, covering 5 to 7 years after the starting of the program. When two main activities of the short term strategy

commence to be operational, subsequent activities from medium term strategy should follow such as:

- Merging of the Pilot AI & T with the compulsory animal movement documents in order to establish tracing back of animals down to the primary livestock markets, pastures and farms;
- The system of AI, MC and T should follow the principles of compartmentalisation set by OIE standards as a concept (not literally) in order to keep the system uncompromised by possible biohazards. It has to be clear that full requirements of compartmentalisation cannot be easily achieved at the beginning.
- Conquering of the new export markets! The responsible Ethiopian authorities, led by AHD of the Federal Ministry of Agriculture should carry out wide campaign of promoting the operational system of AI & T for export of cattle and beef to the potential trading partners abroad. New bilateral veterinary agreements should be signed, clarifying importing sanitary requirements to comply with and the content of the international veterinary certificates signed by Ethiopian federal veterinary officers.
- Expanding AI and T on other animal species, starting with small ruminants and including other regions of the country (e.g. diary farms);
- Linking CDB with other data bases for animal health, registers of producers, subsidies etc…
- Establishment of animal products documents and linking their traceability to AI.
- Establishing Animal Insurance System based on individual animal number or flock number of small ruminants.

5.3.3 Long Term Animal Identification, Movement Control & Traceability Strategy in Ethiopia

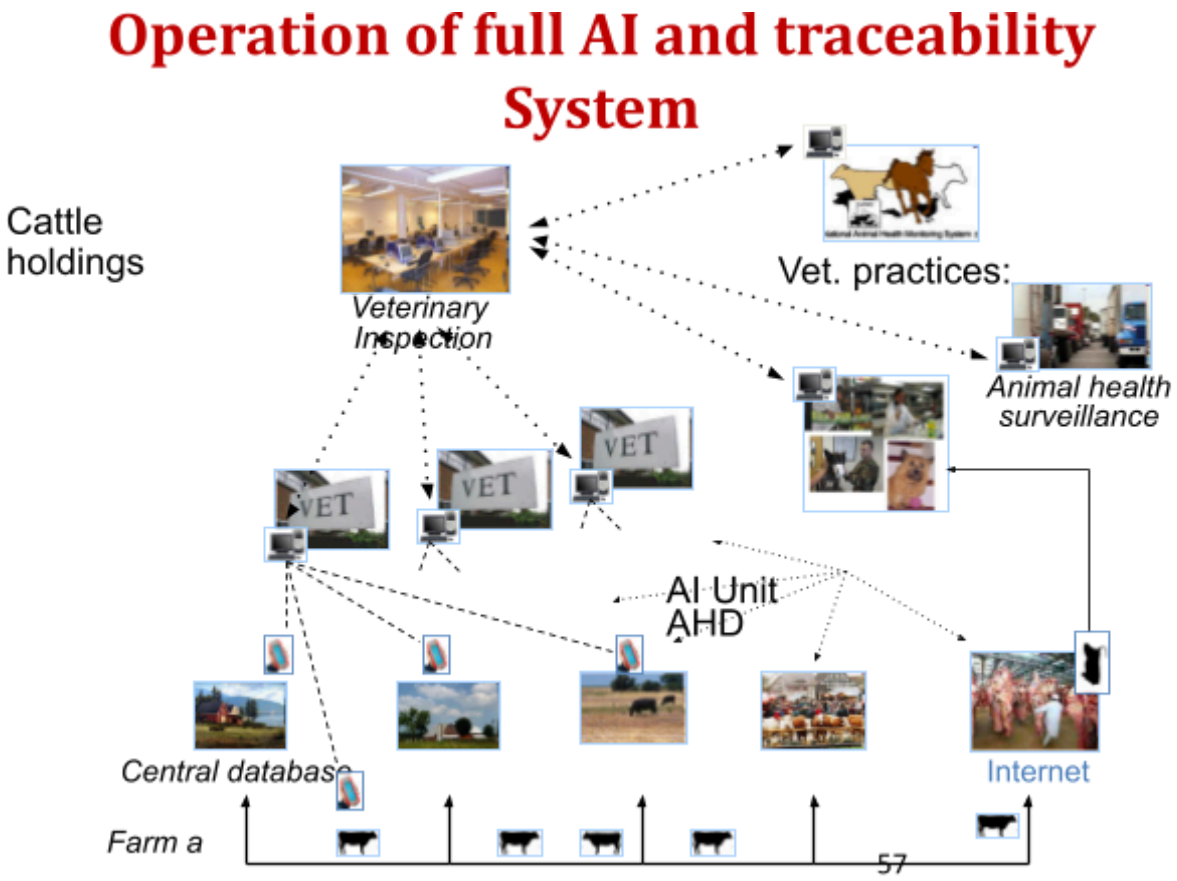
The final objective of the long term AI and T strategy in Ethiopia will be to establish full AI and T system for farm animals in the country and link it to the traceability of animal products in line with OIE and CAC recommendations. The benefits of the system then will not be used exclusively by veterinary service, animal producers and traders, but also can be expanded to all citizens of Ethiopia as consumers of products of animal origin. Regardless of a particular AI and T model selected and developed during the implementation of the short and medium term strategies in Ethiopia, following general activities should be carried out during the long term strategy:

- Holding census – all farms or holdings, keeping animals should be registered in the CDB with individual code or number;
- Animal census and registration in the CDB with possibility for tracing back and reporting movements;
- Establishing central register of holdings and animals for whole country in the CDB;
- Establishing central register of quarantines, livestock markets, abattoirs in the CDB;
- Establishing veterinary information system – AI and T CDB linked all databases in the veterinary services (e.g. animal health, laboratory information systems, veterinary medicinal products, bioresidua testing, animal welfare, import –export, veterinary border inspection etc.);
- Expanding AI &T on all animal species and all regions of the country;
- Linking AI & T of animals with the products of animal origin;

Taking into consideration on one hand the huge farm animal populations in Ethiopia (approximately 50 million cattle and 50 million small ruminants and several million other animal species) and limited resources on other hand, all listed activities of the long term strategy may look impossible and not feasible from today's perspective. However, the system of AI and T as it is recommended by OIE should be built gradually, step by step and it is out of question whether it should be established or not and sooner it starts, sooner it will

be in place. Ethiopia as a country with such a big potential for animal production cannot afford to be excluded from the international trade for non-compliance with international standards.

Figure 2. Example of a scheme of full AI and T system with all animals identified and registered



6 ESTABLISHING MOVEMENT CONTROL DOCUMENTS

6.1 Introduction

Currently no animal movement control documents are practiced in the country and animals and animal products are moving freely without being accompanied by any kind of document. Non existence of movement documents is making traceability of animals and their products almost impossible and their introduction should be paramount for the veterinary service.

The proposed strategy is foreseeing immediate design and enforcement of compulsory animal movement documents in the first, short term phase and when established, merging with the Pilot AI & T in the medium term phase, in order to establish tracing back of animals down to the primary livestock markets, pastures and farms;

6.2 Legislation

Movement documentation requirements should be clearly defined and standardized, according to the scope, performance criteria and desired outcomes, and should be supported by the legal framework. The existing Animal Disease Prevention and Control Proclamation No. 267 from 2002, Part Three – Movement of Animals, Animal Products and By-products Article 12, Subarticle 2 export of animals, animal products and by-products and Article 15, the enforcement of Animal Movement Permit, gives clear provision for compulsory documentation of animal movement in the territory of Democratic Republic of Ethiopia. However this legal obligation has never been enforced by any veterinary authority. Apart from the IVS issued by the federal veterinary officers at the EFL and EA, no other veterinary movement or health document is issued at any stage of animal movement in the country.

6.3 Priority activities

Movement documents are used in many African countries such as neighbouring Kenya and Sudan and also in Ethiopia some 20 years ago which deteriorate and absent currently but still can be achievable in the country. In order to comply with OIE standards and regardless of any project activities, the following actions should be undertaken by AHD immediately:

- Design and enforce the animal movement documents linked to the existing *Animal Disease Prevention and Control Proclamation*, while waiting for drafting and adoption of the new veterinary legislation in the pipeline.
- Training of all veterinary bodies on issuance of animal movement documents;
- Providing the human and other resources needed for implementation.
- Training of all stakeholders on their responsibilities how to obtain and use animal movement documents;
- Exploring options for use of customs road check points and other possible bottleneck places for animal and documentation inspection and control.

6.4 Workplan

Compulsory movement documents are a prerequisite for establishment of MC and tracing back the animals. Their introduction has to be well planned and step by step implemented. Listed activities are *per se* separate project and should be developed in parallel to the pilot AI and T project. The work plan should follow next steps:

1. Before all other activities, a decision is needed on where is it planned to be applied (only one SLM, two, three or all seven SLM in Borena, Oromia state or the whole country?)
2. A survey should be primarily carried out on how many primary livestock markets, kebeles and AHAs are going to be included accordingly.
3. The official documents have to be adopted (like presented templates in Annexes 3,4 and 5), and legalese them with Ministerial Directive.
4. Printing, distributing movement documents and train kebele AHAs to issue them (serial No, archiving etc.)
5. Public awareness campaign for informing the farmers, traders and primary livestock markets (if they have management structure) as well as wider public.
6. After successful implementation of listed activities, movement documents can be linked to the Pilot AI&T system and trace back to the farm, pasture or kebele level.

The movement documents issued by AHAs can be used only for internal purposes and cannot be used for international trade and traceability, simply because the document cannot be matched (for sure) to particular animals that are not as yet individually identified. Introducing movement documents can be also very delicate due to imposing restrictions of movements which is unpopular and can cause a lot of problems in the field.

Next pending questions that need attention are:

- Who will control the system and do we have officers in the field?
- Are there going to be penalties for those not respecting rules?
- Movement documents should be imposed in whole country, but is it is realistic?
- Can the customs road check points and other possible bottle neck places be used for document control?

6.5 Risks

There is high risk if tracing back through MC is done only from 2, 3 or even all 7 SLM in Borana, which will comprise a small part of MC leaving possibilities for intrusions from outside and no power to control it.

The concept is totally new for the stakeholders and in the field, we have actual situation that so far nobody has used any animal movement documents and movement restrictions in the country.

7.1 Introduction

Designing a system of AI and T in Ethiopia is a challenging and difficult task. The large number of animals and animal keepers, extensive farming production and pastoralism, the lack of animal movement documents and controls, unfamiliarity with the concept of traceability of animals and their products and above all, the lack of resources can be discouraging factors to start building of such a demanding and complex system. Nevertheless, several African countries (e.g. Namibia, Botswana), in order to secure their export and animal health status, have already established the AI and T system and several others are in phase of establishing it to a different extent.

During one of the interactive sessions with national experts, a very essential question was raised whether AI and T system is needed in Ethiopia and what is the cost benefit of it and what is the incentive for country?

The general benefits of establishment of AI and T system and recommendations by international organisations were elaborated in detail at the beginning of this report. The total export of live animals and meat from Ethiopia in 2012 reached approximately 300 million US $ and Government of Ethiopia have ambition and plan to rise it up to 1 billion in the future. Therefore, when analysing the cost benefit and incentives of establishment of AI and T system, one should have in mind not how many new markets will be conquered, but more importantly, how to secure existing ones, bearing in mind that almost all importing countries are starting to demand certain level of AI and T from the exporting countries. If we take in consideration only the aforementioned export figures, even without calculating all other benefits of AI and T system, it is more than clear that Ethiopia should start with the AI and T system building as soon as possible.

The more difficult question comes consequently - where and how to start? The AI, MC and T STE within two months of the project engagement tried to give answers to those questions, primarily led by the analysis of the current state in the Ethiopian livestock sector, operations and capacities of the veterinary services and priorities of the Government of Ethiopia, particularly considering the priorities set by the leadership of the AHD of the Federal Ministry of Agriculture.

7.2 The design and architecture of the system

The importance of export of live animals and meat for the country and number of livelihoods directly or indirectly depending on it, leads the clear priority in that direction. Therefore, instead of starting from identification of individual animals on farms and pastures and registering individual holdings, which is currently unrealistic due to the numbers of animals and availability of resources, the design of the AI and T system will start not from the “head” but from the “tail” – the export of cattle and beef. The idea behind this concept is to establish traceability backwards to the certain point where this can be presented as a case to the importing countries. During this period of 3 to 4 months, the veterinary service of Ethiopia can prove traceability of individual animal and certify animal health status of exporting live cattle and animals intended for beef export.

The design is following the OIE principles of compartmentalisation, being clear that the full requirements of compartmentalisation cannot be easily achieved at the beginning. Particular attention was paid to the specific Ethiopian conditions and capacities in order to have down-to-earth approach and not to propose unachievable, expensive solutions that are difficult to implement. The large animal populations, pastoral animal breeding, transhumance and limited resources of the veterinary service requires design that will rely on principles of

bottle neck veterinary checks and imposing AI and T activities on the places where veterinary control can be practically applied.

The concept is also designed in the way that it can be extended to larger groups of cattle and other species and also transferred to other parts of the country. It can also serve as a backbone of the full system of AI and T in the whole country.

7.3 Secondary Livestock Markets

Starting from the point of export, the furthermost point to which traceability can be realistically extended are SLMs at Borana Zone where cattle is sourced for Adama EFL. From this point, it can be known with certainty which animals are intended for export. Those cattle are going to be tagged with ICAR certified official Ethiopian eartags and reported to the central data base by the designated veterinary officer. It is recommendable to eartag the animals with double eartags on both ears for the cases of possible lost one eartag. The veterinary officer will also issue a transport certificate (see the template in annex 4), reporting the individual numbers of the animals and transport vehicles. The veterinary officer will examine clinically the animals and also certify that at the moment of loading, animals with certain individual identification numbers show no clinical signs of diseases.

7.4 Export Feedlots

The second phase of the pilot project for establishing AI and T system are EFLs, where animals are kept for the period of 2 to 3 months. This is the part of the system where actually all veterinary sanitary measures required by importing countries and international standards are going to be applied. The Adama Federal Quarantine Office will receive all individually tagged animals sourced at the Borana SLMs, accompanied by transport certificate issued by SLM veterinary officer and report the entrance of the individually identified animals in the EFL to the CDB. According to OIE FMD recommendations for export of beef the period of 3 months is sufficient to “nationalise” the animals to the EFL and carry out all vaccinations, diagnostic testing and other veterinary measures required by importing country. At the same time this is more than enough time for any disease that as acquired before SLMs to appear and to be detected. After finishing of the EFL period, before moving out, the Adama Federal Quarantine Office will issue national veterinary certificate for the veterinary sanitary measures carried out and the health status of the animals that will enter EQ in Mille or EAs. This will also be reported to the CDB for all individual animals. All deaths of animals or disease occurrences will be reported as well.

7.5 Mille Export Quarantine

All animals that entered the pilot project and are intended for export as live animals will be passed through next phase of the system in Mille EQ. The federal veterinary quarantine officer at Mille EQ will receive the animals from EFLs, individually identified and accompanied by national veterinary certificate, issued by Adama federal quarantine officer and report to the CDB at the entrance and also at the exit of the animals. The veterinary quarantine officer will be responsible for implementing all quarantine measures and standards prescribed in OIE Terrestrial Animal Health code as well as particular requirements by importing countries. At the end of the quarantine he will issue IVC for live animals and report to the CDB.

7.6 Export Abattoirs

All animals that entered the pilot project and are intended for export as beef, from EFLs will be transported to export abattoirs, accompanied by national veterinary certificate, issued by Adama federal quarantine officer. The EA federal veterinary officer will receive the individually identified animals, report their slaughter to the CDB, cancel and collect their

eartags. At the dispatch the officer will issue the IVC for the meat, which among other statements, will certify known origin and animal health status of the slaughtered animals.

7.7 Border Inspection Posts

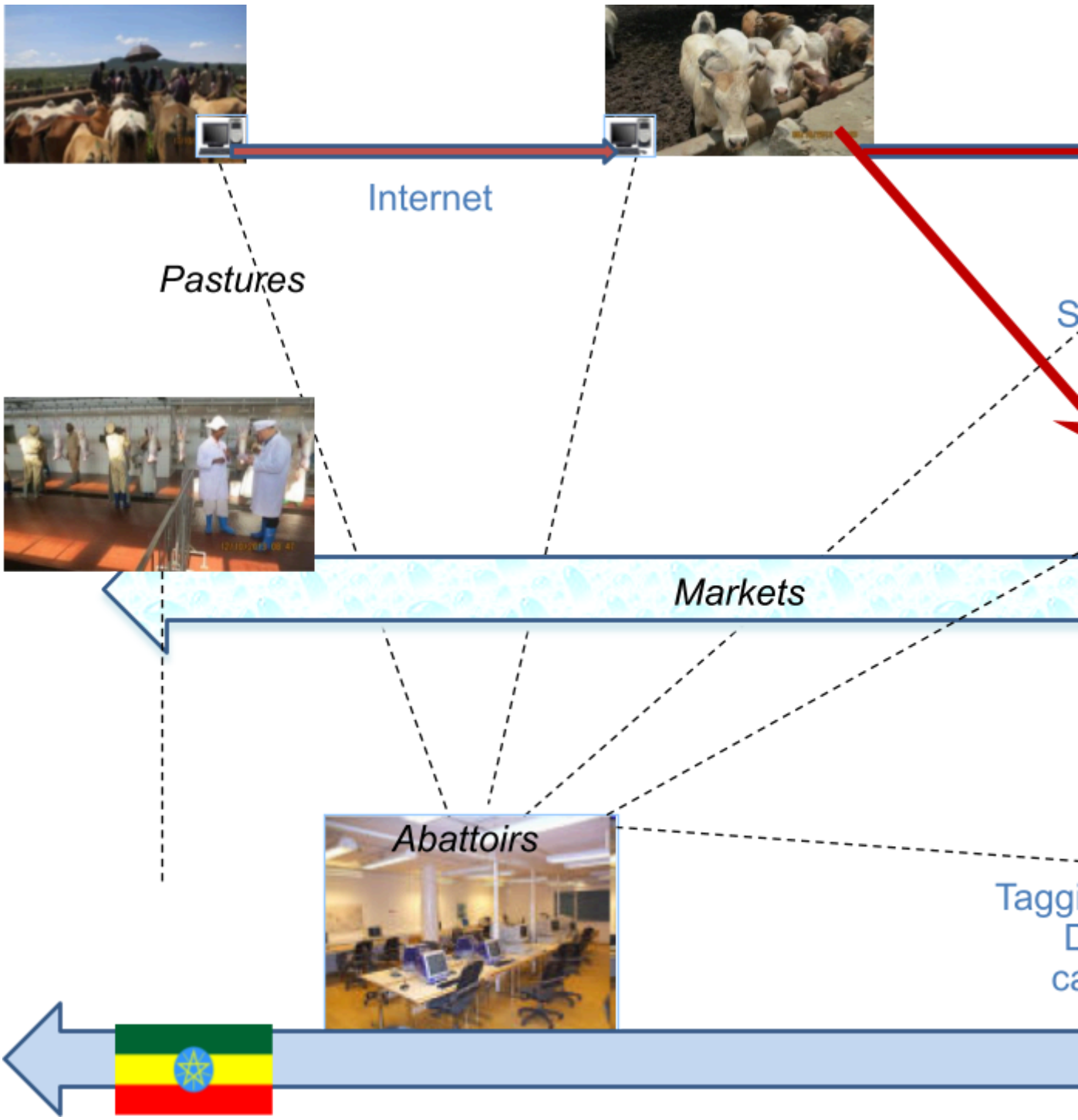
It has to be decided whether border inspection posts are going to be included in the system of AI and T as reporting points for exit of live cattle or beef from the country, or this activity is going to be transferred to the EQ and EA as exit points reporting to the CDB. Different countries implement different models.

7.8 Central Data Base and Animal Identification Unit at the AHD

All movements of the animals, starting from tagging at the SLMs, transport to EFLs, sanitary measures applied at EFLs, exit from the EFLs, transport to EQ or EA, all the way to the slaughter or exit from the country, must be reported to the CDB at the AI unit (case team) of the AHD in Addis Ababa. All reports will be submitted through internet applications managed by specifically designed software and hardware (PDAs or Laptops and connections, preferably VPN). At any moment the CDB will be able to report the location and animal health status of all animals that entered the system at the SLMs with individual identity number, serving as an essential tool for proving traceability. The AI unit (case team) of the AHD will be responsible for running, maintenance and control the whole system starting from the CDB down to individual animal in the system. The unit will keep the registers of SLMs, EFLs, EAs and EQs as well as registers of all traders, transporters and exporters of cattle and beef for export.

The scheme of the architecture of the system of AI and T of export of cattle and beef in Ethiopia is given in following figure

Figure 3. The scheme of the architecture of the system of AI and T of export of cattle and beef



This concept of AI and T presents a strong case and gives assurances to the importing countries of live cattle and beef, that Ethiopian veterinary service can establish traceability and control of exporting animals to the extent that they will not present risk to their human and animal health.

The proposed system will not be bullet proof and AI and T are only tools that serve other veterinary activities. They cannot *per se* protect the animals from biohazards. Many things, starting from biosecurity alongside the chain of movements of the animals that entered the system, must be gradually and considerably improved. This was extensively described in previous parts of this report.

7.9 Selection of the means of AI

This is one of the critical decisions in design of the system and therefore different possibilities were elaborated extensively in the previous parts of the report. However the choice of AI devices for Ethiopia should be carefully considered having in mind:

- Cost of the system;
- Number of animals in the system;
- Type of breeding and operations (pastoralist etc.);
- Operator capacity (operators, handling facilities);
- Accessibility of equipment and field power sources;
- Veterinary services human resources to run, maintain and control the system

The existing eartags currently used at the EFLs cannot be used for official tagging since they are not officialised and can be purchased freely at the market allowing duplications and fraud.

Are certified ICAR plastic ET with barcode most suitable solution for starting AI system?

The use of PDA (today every smartphone can be considered as PDA) with barcode reader won't increase significantly the cost of the system, while on the other hand can be useful for reducing reading errors and direct data entry in to the system. Electronic identification is mainly seen as an alternative to paper-based solutions. However, the automated reading of the animal's ID can also be ensured by robust barcodes. The first choice of the means of identification should be an eartag. Consequently, the second means of identification may be an eartag with the same characteristics, a tattoo, or an electronic transponder. The electronic identification should be used as soon as the acceptable technology is available at a price which is not out pricing the value of the animal. Just for example, the present price is about 2-3€ per electronic identifier while the two cattle eartags for 0.45€. A simple reader for electronic identifiers is available for less than 100€ while a high-tech reader costs 500-800€.

Table 1. pros and cons for conventional and electronic means of AI

	EARTAGS	RFID
	PROS	**PROS**
1	**Cheap**	**Reduced manual labor**
2	**First choice when establishing AI**	**Direct data recording**
3	**Users Familiarity**	**Possible remote tracking**

4	**No reading devices needed**	
	CONS	**CONS**
1	Reading errors	Expensive, delicate for maintenance
2	Laborious	Upgrade to existing AI
3	Reprints expensive	Need training
4		Cost effective only on large farms or operations (abattoirs, LS markets etc.)

As a conclusion, for the purpose of establishment of the first AI and T system in Ethiopia, it is highly advisable to use ICAR certified plastic ear tags containing barcode type as well. This is supported by all interviewed stakeholders and veterinary professionals during the field mission agreeing that this is the most convenient solution for all.

7.10 Creation of Central Data Base

The CDB is the point where all the data on animal identification, brand registration, movement records, establishment registration, owner registration, live cattle export registration, and animal disease events will be processed and stored. It is the backbone of the system and general requirements are described in the guidelines part of the report. The system should be able to provide rapid and comprehensive tracing of individual animals and other animals with which they have come into contact. Related animals and herds should be recorded. Tracing should be both backwards and forwards from any selected date.

Filters and codes are in place to limit unauthorised access to the data, allowing different officers to make only the entries and alterations that they are permitted in accordance with their grades and authority areas. The database tracks changes and maintains records of those who make them.

There are several critical steps that have to be carefully planned and timed while building the CDB and building of all other components of the system depends on them.

They are following:

- Preparation of an implementation strategy, including: procurement timetable, hardware and software installation and testing programme, training requirements, awareness and publicity campaigns, time schedule.
- Identification of costs for the initial and ongoing operation of the CDB
- Prepare supply tender documents (computer hardware, software, communications and network requirements, eartags and printed materials, and any other inputs required for the running and maintenance.
- Designating adequate placement, possible outsourcing and providing internet or VPN connection.
- Development of central register of SLM, EFL, EA, EQ, animal traders, transporters.

In order to allow further functioning, development and extension of the AI and T system, several requirements or rules must be considered from the beginning of the design of the CDB and they should be also clearly stated as criteria in software and hardware procurement tenders.

The CDB must be:
- Expandable to the level that will have capacity to include all livestock markets, feedlots and abattoirs in the country;
- Expandable to the level that will have capacity to include all holdings and with capacity for all farm animals in the country;
- Connectable to other DB (animal health, laboratories, breeding, subsidies etc...);
- Provided with the source code as a part of the contract with the software supplier that will allow managing the further software development efficiently.

When procuring custom-made software it is common to ask for the full source code and technical documentation, and to request that the material rights be passed to the investor. It can be argued that since the AI and T software is sold in very few copies, and each needs extensive customisation, it is reasonable to acquire it as if custom-made, and ask for exclusive material property rights within the country. This protects the investments in the case that the developer goes out of business, and secures independence for further software development or procurement.

It is important to secure means for software modifications and additions in the first years after the initial implementation.

The CDB should provide assistance with the ordering and distribution of animal eartags. Traceability of eartags should be supported so that it is always known where the tags are, used or unused. Data integrity (data validation): the system should include a high level of data validation and verification, i.e. it should not allow the same animal or movement to be entered twice into the system, it should only allow code numbers to be entered with the appropriate format (e.g. ear tag number), it should not allow the movement of dead animals, etc.

The development and maintenance of the CDB infra structure requests professional support by system administrators. Therefore at least one IT person has to be available for the administration of the network and the support of the users. The CDB IT Manager tasks will be:

- DB administration (create the users, passwords, privileges etc.);
- Provide hands-on assistance in running the system, trouble shooting, and error correction;
- A lot of day-to-day tasks like approving the ordered eartags for the SLMs, entering the data into CDB etc.

7.11 Required Resources and Cost of the Pilot Project

Before calculating the costs or starting any other activities, the pilot project should determine first:

- How many EFLs are suitable for the project and how many are willing to participate?
- From which SLMs they source cattle?
- How many SLMs are going to be included?

- How many animals will approximately enter the system?
- Consequently, how many veterinary professionals, auxiliaries and IT experts are needed and are they available?

Only after precise determination of those questions it will be possible to calculate seriously the costs of the pilot project and necessary human, material and financial resources for its functioning. The following table, without ambition to calculate exact costs at this stage, gives the indicative estimation of required human and material resources for starting of the pilot project.

Table 2 indicative estimation of required human and material resources

INDICATIVE ESTIMATION OF HUMAN AND MATERIAL RESOURCES		
	HUMAN RESOURCES	**MATERIAL RESOURCES**
SLM	2 Federal vet officers, 1 Zonal DVM (+1 existing) 1 IT person (outsourcing) 2-4 tagging assistants (on a market day)	Eartag storage and management, Restraining (holding pen, chute, crush pen at the SLM); Vehicle for eartag distribution, equipment and personnel; H/W 2 PDA, 2 laptops, printer, connection, power generator; S/W protocols development
EFL	2 to 3 Federal officers + existing 1 2 Federal AHAs 1 IT person (outsourcing)	Vehicle for EFL control, transport of equipment and personnel; H/W 4PDA, 2 laptops, connection; S/W protocols Coldstorage for vaccines and lab samples
EQ	1 Federal officer employment + existing 1; 2 Federal AHAs? 1 IT person (outsourcing)	H/W 2PDA, 2 laptops, connection; S/W protocols; Development of animal movement and sanitation protocols; Vehicle for transport of equipment, personnel and samples to the designated laboratory? Cold storage for vaccines and lab samples
EA	1 Federal officer employment + 1 existing IT person (outsourcing)	H/W 1PDA, 1 laptop, printer, connection S/W protocols
AI UNIT **At AHD**	2 to 3 DVM + existing 1 Helpdesk operator (DVM or AHA) 2 IT person (permanent CDB operators)	Eartags , S/W and H/W procurement (tenders) Vehicle for controls of the system, distribution of eartags, S/W and H/W; H/W 6PDA, 4 laptops, connection VPN? S/W adaption, protocols development

The biggest cost at the beginning for the establishment of the AI and T pilot project will be procurement of the software and hardware and their installation and customization. The pilot project should expect six figures $ bill for those procurements and activities. The approximate cost of ICAR certified plastic eartag for cattle with or without barcode is ranging from 0,2 to 0,6 €/piece, depending on quantities and cost of ear tag pliers is €15/ piece. The cost of RFID eartags vary from 2 to 3 €/piece. The costs of increasing of the biosecurity in the EFLs and particularly Mille EQ should be additionally calculated. Printing, mailing, running offices, trainings of the participants in the pilot project as well as public awareness campaigns should also be added to the overall cost of the pilot project.

The capacity to introduce the system will depend directly on possibility to mobilize additional technical assistance and procurements through dedicated separate AI and T project as well as on the national policies and regulatory frameworks, competence of personnel and resources mobilized to operate efficient and effective veterinary services. Equally important is the general public awareness and the active participation of key actors along the value chain of the livestock industry.

7.12 Trainings

Primarily it is important to identify the needs, design and provide further training as required to ensure that feedlot operators, livestock traders, slaughterhouse operators, field veterinary workers, veterinary officers, and AHD staff incl. logisticians and help desk operators perform their functions satisfactorily. Possibilities should be analysed to conduct interesting study tours to the African countries with established AI and T System (e. g. Namibia, Botswana).

The different target groups need different training materials. Brochures and presentations should be produced and presented to the field operators and explain the concept to livestock trading and meat export associations. The instruction manuals for different operators should be presented in the training. The two main types of trainings should be carried out for the purposes of the pilot project. The first one will be introduction to the system and pilot project of AI and T of export cattle and beef, targeted for for:

- Veterinary workers at:
    - AHD AI, Quarantine, EA units;
    - SLM, federal and state vet officers;
    - EFL, Q and EA
- Stakeholders:
    - SLM managers (SLM Agency)
    - EFL owners and managers
    - Different level livestock traders
    - Livestock exporters
    - EA owners and managers

The second type of training will be in the later phase during the implementation and will include:

- Documentation and certification training for the veterinary officers;
- Specific on-job trainings for all participants in different parts of the project;

A Public Awareness Campaign should be carried out for the informing of the animal keepers, animal traders, other stakeholders and wide public in Ethiopia.

7.13 Assumptions and risks

When establishing AI and T system in Ethiopia, the experiences and lessons learnt on implementing similar programmes in developing countries have to be taken in consideration. Usually, the failure to sustainably implement AI and T systems in these countries has mainly

resulted from a combined lack of financial resources, lack of capacity in the implementing institutions and lack of participation by farmers, breeders and other stakeholders.

The high costs of infrastructure for AI and T systems (e.g. computer hardware and software, equipment and transport) and operational costs (e.g. ear tags and field staff travel) have been main obstacles for many developing countries. Governments have generally failed to commit and sustain adequate resources to AI and T programmes because of a lack of awareness of their importance. A cost-benefit analysis is necessary to indicate where funding for certain components should come from.

In Ethiopia, several particular issues are potential risks for the start of the system and have to be addressed as priorities at the very beginning of building of the Pilot AI and T project:

- The existing veterinary legislation is not providing legal frame for the implementation of the system of AI and T. The new veterinary legislation in pipeline is addressing all AI and T activities, both on the level of proclamation and separate AI and T regulation, but the adoption process in the legal institutions is time consuming and out of the power of AHD.
- The designing and building CDB is crucial for starting of the system and preparation of an implementation strategy, procurement timetable, hardware and software installation and testing programme is also time consuming and must start before all other activities.
- It is necessary to prepare timely supply tender documents (computer hardware, software, communications and network requirements, eartags and printed materials, to designate adequate placement, possible outsourcing and providing internet or VPN connection.
- Export Quarantine in Mille is still in a phase of construction and not operational. The resolving of the problem of water supply and construction adjustments for improving quarantine biosecurity standards and avoiding contacts and crossing between different batches of animals can put in question its functionality as a part of the pilot project.
- Export feedlots that will enter the pilot project must be carefully selected and full cooperation of their management must be secured. Improvement of biosecurity will also require financial commitments and government support should be provided in order to facilitate their participation in the system.
- Stakeholders' participation (animal traders, transporters, EA, SLM managers etc.) is always critical for the functioning of the system and iincentives, other than possible export, should be introduced by relevant government institutions and donor projects, in order to attract all stakeholders to join and support the system.
- Providing sufficient human resources for the pilot project and their on-job training is also critical point for the functioning of the system. In many cases in developing countries technical assistance, including some human resources are provided by donor projects and after their finishing, beneficiaries does not have capacities to provide sustainability of the activities of AI and T.

8 CONCLUSIONS

The FDR Ethiopia should start with the building of the AI and T system as soon as possible by implementing pilot project for AI and T for export of cattle and beef as a high priority for the country.

In parallel, animal movement documentation should be introduced in the field, in order to enable the traceability of animals down to the farm and pasture level. It can be based on existing veterinary legislation and should not wait for the adoption of the new legislation. It will introduce restrictions for all stakeholders and therefore it should be well planned and gradually implemented.

The design of the pilot project should be based on the analysis of the current state in the Ethiopian livestock sector, operations and capacities of the veterinary services and priorities of the Government of Ethiopia, particularly considering the priorities set by the leadership of the AHD of the Federal Ministry of Agriculture.

After its implementation, the pilot project for AI and T for export of cattle and beef will present a strong case and will provide assurances to the importing countries of live cattle and beef, that Ethiopian veterinary service can establish traceability and control of exporting animals to the extent that they will not present risk to their human and animal health.

An AI and T system should be matched to the available infrastructure, operate at a low cost and be no more complex than is necessary. Its implementation should be phased, and AHD should ensure that they have adequate capacity before beginning with the programme.

Specialist skills in areas such as information technology, database management, animal identification, recording and technology transfer are essential. It is important that the implementing institutions develop systems that provide feedback and demonstrate the direct benefits to farmers. This may be achieved by streamlining AI and T systems serving different purposes and incorporating them into a service package (e.g. subsidies, animal insurance etc).

It is obvious that it will be almost impossible to start the pilot project without donor support in technical assistance and procurement of AI and T equipment. The scope of activities and procurements is so wide that requires separate AI and T dedicated project, not as a part of other projects.

The Government of Ethiopia, through AHD of Ministry of Agriculture as competent authority should provide all means and resources for maintenance of AI, MC and T as a sustainable and developing system not only as temporary project.

ANNEX 1 LIST OF VISITED PLACES

	DATE	CITY	VISITED FACILITIES AND ACTIVITIES
1	07.10	Adama	Trip to Adama and visit of EFL
2	08.10	Adama	Visit of EFL and Federal Quarantine Veterinary Office, discussion with EFL owners and live animal exporters
3	09.10	Logia	Visit of sheep and goat EFL. Trip to Logia, Afar.
4	10.10	Logia	Visit of the Mille EQ
5	11.10	Mojo	Travel to Modjo. Meeting with Dr. Remeicans And Dr. Meleku
6	12.10	Mojo	Visit of Mojo Modern EA
7	13.10	Mojo	Visit of Modjo Organic EA and travel to Awassa
8	14.10	Awassa	Travel from Awassa to Yabello
9	15.10	Yabello	Meeting live animal traders, livestock expert from Zone ministry and Zone vet officer
10	16.10	Yabello	Zone agricultural officer in Yabello, head of zonal agency for markets
11	17.10	Elweiya	SLM at Elweiya, discussion with live animal traders and city Major
12	18.10	Dubuluk	SLM at Dubuluk, discussion with live animal traders.
13	19.10	Awassa	Travel to Debre Zeit
14	20.10	Debre Zeit	Visit of Hashim Nuru EA

ANNEX 2 LIST OF PERSONS MEET DURING THE FIELD MISSION

Person	PLACE
1. Dr. Kimya, quarantine expert in Adama EFL	Adama
2. Mr. Fitsum, assistant quarantine expert in Adama EFL	Adama
3. Mr.Emiru, EFL owner at Koka,	Adama
4. Mr.Zeinab Ahmed, EFL owner at Koshe,	Adama
5. Mr.Shagi Sheep and goat EFL at Awash	Melkasa
6. Mr.Hussein Ahmed, livestock exporter,	Adama
7. Mr.Abdullohab Beqebo, livestock exporter,	Adama
8. Dr. Wondimagegn, Quarantine expert,	Mille, Afar
9. Mr.Habtamu Kefyalew, Owner and manager of livestock trading enterprise	Yabello
10. Dr Bula Mengesha, veterinary expert, Borana Zone Pastoral Development Office	Yabello
11. Mr.Shibru Ordofa, livestock expert, Borana Zone Pastoral Development Office	Yabello
12. Mr.Petros Wako, deputy head of Borana Zone Pastoral Development Office	Yabello
13. Mr.Mohammed Dawi, livestock marketing Borana Agency for Markets	Yabello
14. Mr.Amsasew Tesfaye, Elweiya town administrator, Borana	Elweiya
15. Mr.Dagne Mekonnen, Livestock trader, Dubuluk SLM Borena	Dubuluk,
16. Dr Kassahun, meat inspector, Hashim Nuru EA	Debre Zeit
17. Dr Kedir, Hashim Nuru EA	Debre Zeit

Official Veterinary Health Certificate in FDR Ethiopia

HEALTH CERTIFICATE

INFORMATION GIVEN BY THE OWNER/USER OF THE ANIMAL

Name &surname of the owner/user of the animal(s)_____

ID no. of owner/user of the animal(s) _____

Address of the owner/user of the animal_____

Holding address of the animal _____

Information about the animal _____
/number of animals, species, sex, color, age

Specific signs of the animal_____

ID marks _____
/ Stamp, ear tag nr. ,/

Former health certificate of this animal _____
/ Nr., date, name of municipality, date of the issuing /

_____

NOTES: The animal owner/user declares that these animals which are sent for slaughtering, are in the last three weeks not treated or fed with medicaments.

Information given by the owner/user of the animal

Signature

INFORMATION OF VETERINARY EVIDENCE

Vaccination _____
/date and type of disease/

Diagnostic testing _____
/type of test, results, date/

Information about the curing of animals _____

Veterinary examination _____
/diagnosis and date/

/ To be filled by the authorized person for issuing this certificate based on the record from veterinary services i.e. based on evidence from the veterinary organisation.

CERTIFICATE ON HEALTH CONDITION OF THE ANIMALS

This certificate confirms that at the time of issuing of this certificate there was no disease that animals of the above mentioned species can transfer and in the place of their origin and for which the competent authority put on a ban or restriction of movement of animals of these species.

This certificate is valid for 10 days only since the day of issuing or the day of prolongation of validity, and can be prolonged 1 year from the date of issuing.

Serie _____

Date _____

Woreda/Kebele _____

SIGNATURE OF AUTHORIZED PERSON

FOR ISSUING THE CERTIFICATE

_____

Official Veterinary Transport Certificate in FDR Ethiopia

Ministry of Agriculture - Animal Health Directorate
Veterinary Inspection _____
Nr. _____
Date _____20__.

STATEMENT /RECEIPT

On identification and health condition of animal consignment which are delivered with transport vehicle in the FDR Ethiopia inner traffic

At the time of loading I inspect the consignment of _____animals marked with individual eartag numbers
_____
_____
_____
_____
_____
_____

Loaded at transport vehicle _____(mark and nr.)_____
Driven by (driver name and ID)_____

and

I hereby confirm that at the time of loading, listed animals didn't show any clinical signs of disease and there is no reason for restricting delivery of the consignment regarding to veterinary – sanitary conditions.

Sender_____
From_____

Recipient
_____in_____

Place of unloading _____

Veterinary Officer

_____

Abattoir Animal Health Certificate in FDR Ethiopia

HEALTH CERTIFICATE
for live animals transported from the holding or market to the slaughterhouse

Competent service: _____

No: _____

1. Identification of the animals:

Species: _____

Number of animals: _____ Identification marking:_____
_____
_____
_____

2. Provenance of the animals

Address of holding of provenance: _____

Identification of house (optional): _____

3. Destination of the animals

The animals will be transported to the following slaughterhouse: _____

by the following means of transport: _____ _____ __

4. Other relevant information: _____

5. Declaration

I, the undersigned, declare that:

- the animals described above were examined before slaughter at the abovementioned holding at _____ (time) on _____ (date) and were found to be healthy;
- the records and documentation concerning these animals satisfy the legal requirements and not prohibit slaughter of the animals.

Done at: _____
(place)

on: _____
(date)

Stamp

_____
(signature of the official veterinary officer)